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ABSTRACT

This study reports on levels of achievement among rural black and white Southerners of relatively low socioeconomic status. The 262 persons who were the objects of the study were reared in Millfield, North Carolina. They were first studied by Baughman and Dahlstrom (1968) in the early 1960s when they were in the eighth grade. Ten years later, this study located and, through interviews, collected data from 175 or 67% of the 262 eighth-grade subjects. Conclusions include the following. Performance on the eighth grade standardized tests of intellectual and academic ability was found to be clearly related to subsequent achievement, both educational and economic. Although there was a lack of racial differences in educational attainment, black subjects achieved significantly lower job statuses and earned significantly lower incomes than white subjects. The study found a strong association of the family size cluster with achievement. This finding is consistent with population theorists' arguments about how having many children or having children close together creates burdens on a family system which often reduce opportunity. Few significant relationships were found between migration and achievement. In fact, most of the Millfield eighth graders did not move very far away from home. However, living away from Millfield, even if only for a brief period of time, was associated with greater achievement. For comparison purposes, the study also presents findings from major longitudinal studies of similar psychological characteristics. Trends in social change in this area of the South are also described to give the reader a feel for the people and the times in which they matured. (Author/RM).

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PREDICTING ACHIEVEMENT:

A TEN-YEAR FOLLOWUP OF BLACK AND WHITE ADOLESCENTS

Joseph Lowman
M. David Galinsky
Bernadette Gray-Little

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Chapter 1

INTRODUCTION

Achievement is an area within psychology to which a great deal of study has been devoted over the last twenty-five years. This is in part due to the fact that achievement has been such a central issue in American life. Americans have an often passionate concern with social status, awards, academic degrees, championships in athletics, the accumulation of financial wealth, and with receiving personal recognition. However, there has been considerable ambivalence about so pervasive an emphasis on achievement. On the one hand it is viewed as the necessary underpinning for a growing, developing, and continually prospering society; on the other hand, an overattention to achievement concerns has been seen as underlying the dehumanization of society, lack of concern for one's fellow man, wanton destruction of property in the name of progress, and a host of other ills. Studies of the achievement motive begun by McClelland in the early 1950s took the more positive view that achievement was related to positive societal developments and grew out of early independence training. In fact, McClelland (McClelland and Winter, 1969) later attempted to train people in underdeveloped societies to adopt beneficial characteristics of achievement motivation such as future time orientation and intermediate risk taking. In contrast, others have expressed concern about an overattention to the achievement of financial success, to getting to the top, and to developing a set of attitudes toward achievement that makes it the be all and end all of existence. Nevertheless, there appears to be a universal psychological predisposition (need, drive, or tendency might describe the motivational force equally well) to prove one's self, one's skill, one's worth, and as a result, to gain self-esteem.

Much of the research about achievement has been based on observation of highly motivated executives, entrepreneurs, and career professionals--symbols of the contemporary work ethic. Much less attention has been paid to the role of achievement-strivings in the work lives of skilled and unskilled laborers, small farmers, and low-paid civil servants. How much the predominant view of achievement in American life applies to this

group of individuals is a question we address. Levels of achievement among rural southerners of relatively low socioeconomic status are studied at two critical points in the life cycle. This group is commonly thought to be atypical of the American experience and is frequently ignored in studies of personality and motivation. In a sense, this group is more typical of those in developing countries who McClelland and Winter were attempting to train than it is of the more frequently studied subjects in American research on achievement motivation.

The 262 persons who were objects of the study were reared in the piedmont of North Carolina. They were first studied by Baughman and Dahlstrom (1968) in the early 1960s when they were in the eighth grade and by us a decade later when they were in their early 20s. The group was relatively homogeneous in economic and cultural background and was equally split between blacks and whites. Thus, the study provides a unique opportunity to examine continuities and discontinuities in achievement among racial groups and compare factors which predict achievement for other socioeconomic groups raised in markedly dissimilar surroundings. The ways in which achievement develops (or fails to develop) to facilitate educational and occupational success are studied. In addition to studying the effects of extremely high, perhaps too-high levels of achievement, we are concerned here as much with the development of levels of interest in achievement adequate to produce at least minimal success in life.

The same range of achievement behavior is in fact present among these rural youngsters as among their more comfortable cousins in the cities. Some subjects forge ahead and succeed beyond expectations and against monumental odds, while others lag behind, fail to achieve very much by society's standards, and perhaps by their own standards as well. It becomes apparent that achievement is a complex psychological construct encompassing factors related to pure ability, but also to various kinds of motivational factors as well. As defined here, *achievement* refers to an individual's level of success at activities commonly valued by the members of our society and in which all persons must participate--formal schooling and work. The movement toward universal education over a century ago assured that every child must face a predictable set of challenges associated with intellectual activity, social adjustment, and peer interaction. American educational institutions insure that virtually all children will be faced with such challenges and will be given feedback, much of it public, on how well they have succeeded. This state of affairs does not change markedly when the school door closes behind a youngster for the last time, in that the same demands and reward structure operate in the world of work.

Although there is a great deal more latitude open to the individual in the work situation, the same system of challenges and rewards is evident.

What are the *psychological* factors within individuals that are associated with their likelihood of achievement in schooling or work? Much as our democratic social ethic might like to suggest otherwise, there are fundamental variations in *ability* among individuals which are related to achievement. Some people are faster, stronger, and more socially adroit. There are significant differences among people as to intelligence--the ability to think abstractly and to learn quickly. Some handle words and juggle abstract verbal concepts with impressive skill, while others speak and think more slowly and in simpler ways. Skill with quantitative or visual-spatial symbols is also distributed among the population in varying degrees. However, individual differences in ability are by no means sufficient to account for observed variations in degree of achievement.

Several motivational factors are also related to scholastic achievement. Certainly *choice*, or a person's decision to apply his or her energies to a given challenge, is important. Similarly, adults differ as to their attraction to different jobs. Research on vocational choice (Galinsky, 1962; Galinsky and Fast, 1966; Nachman 1960) indicates that a sense of identity based on a consistent developmental history is an important requisite for choosing a life's work. Studies point to similarities in development among members of the same occupation and suggest that certain kinds of experiences may lead to problems in development that make successful choice of occupation difficult. Varied developmental experiences are also related to differential abilities to meet the demands of and differential desires to seek the gratifications provided by different occupations.

In some ways the process of choosing an occupation involves correlating the compatibility of job and self-concept. For example, an occupation such as policeman or fireman might offer a wealth of traditional masculine satisfactions, while the more nurturing jobs of nurses, doctors, and other health care specialists are likely to be chosen for different reasons.

Choice can operate only within the range set by ability and previous educational achievement, however. The fact that many of the most attractive jobs in our society are highly competitive and open only to those who have done well in advanced education greatly restricts the ability of choice alone to predict final achievement. This emphasis on educational achievement also fosters undue anxiety about adult occupational success among

the very young and closes the doors of opportunity to many people early in their lives.

Taken together, ability and choice are still not sufficient to account for all differences in achievement. The psychological attribute of *perseverance* also makes a significant contribution. Some individuals simply try harder than others at any task. This tendency, particularly in the face of setbacks and frustrations which might decrease desire and confidence, also influences achievement. At the same time as someone rises to the top primarily because he or she "is so hungry for it," ability may be wasted by others content to coast along performing at levels well below their maximum capabilities.

These three psychological constructs--ability, choice, and perseverance--would seem to exhaust the range of psychological factors accounting for differences in achievement. However, external systematic differences in the *opportunity* available to different persons also affect subsequent educational or occupational achievement. The status of one's parents influences admission to and success in public or private schools, the kinds of neighborhoods in which one lives, and the personal styles--ways of speaking and comporting oneself--as well as the chance to acquire tastes likely to be found acceptable in later occupational or social settings. Racial, religious, ethnic, and sexual identification also play major roles in restricting or facilitating economic opportunity. Federal legislation designed to insure equal opportunity regardless of these ascriptive characteristics is a testament to the power of the influence of demographic variables in society.

Our research is based on this multi-level model of achievement including as outcome criteria, predictive variables and moderating variables, a wide range of factors reflecting ability, choice, perseverance, and opportunity. Although methodological realities prevent the data from directly addressing the question of the relative contribution of each of these major sources of variance in achievement, the data do allow some conclusions about the role of each factor. They also provide information about the degree to which achievement is influenced by the rural setting of the subjects' upbringing, their racial background, and their likelihood of emigrating from the South. Because the subjects were first studied in their early teens, predictive variables are restricted to those dealing with family background, intelligence and achievement test scores, and personality characteristics in early adolescence. Later measures were gathered at a time when the subjects had shifted from school to the world of work, making it possible to compare predictor variables with initial occupational choice and final

educational achievement. Since many of the subjects of our study had already begun to raise families by the time of follow-up, it is also possible to examine the role such responsibilities have on achievement.

Several major issues relevant to this longitudinal study of achievement may now be discussed. Although this research deals with an atypical population, findings from the major longitudinal studies of similar psychological characteristics are presented for comparison purposes. Because our data examine racial differences in intelligence and achievement, theoretical issues and research relevant to this issue are also discussed. In that the decade of human life cycle under investigation is one often characterized by turbulence and change, a discussion of the process of personality development from adolescence to young adulthood and entry into the occupational marketplace is also relevant. A summary of the results of Baughman and Dahlstrom's previous work on the same subjects, especially the paradoxes in their findings which prompted this followup, and a description of the setting they named Millfield is presented. Finally, trends in social change in this area of the South in the decade in question are described to give the reader a feel for the people and the times in which they matured.

PREVIOUS LONGITUDINAL STUDIES

Longitudinal studies focusing on psychological attributes are heirs to Galton's classic work on the inheritability of intelligence (see the 1925 republication of his 19th century work). However, Galton's methods of selecting families, as well as his role as an apologist for the elitist class system of Victorian England, have raised serious questions about the adequacy of his conclusions about the consistency of intellectual proficiency among family members and across generations. Nonetheless, his conclusions stimulated a number of ambitious, longitudinal studies begun in this country in the first third of the twentieth century. These studies dealt with a number of other psychological variables in addition to intelligence and were based on modern canons of acceptable scientific procedure.

Terman's studies of gifted children are among the most notable of these modern studies (Terman, 1926, 1930; and Terman and Oden, 1959). Although he studied a special subgroup of youngsters, he was concerned with a great deal more than their intelligence or academic achievement (Oden, 1968). For example, measures of interests, character or values, and physical health were also gathered. Although the various studies published by the Terman group cover a complex array of concepts and variables,

many of them are directly relevant to this study of achievement. One of Terman's fundamental conclusions was that his subjects' intellectual superiority when first identified around age 11 was associated then and later with superiority on a number of other dimensions as well. Educational and vocational achievement were, not surprisingly, the most notable of these. Terman's gifted sample covered the entire range of academic achievement (a few did not complete high school), although most attained much more education and higher occupational statuses than typical of the population. The females in his population were in most respects similar to the males, although their jobs were of slightly less status and earned them considerably less income. This classic study, then, found high achievement to be more characteristic of this group of highly intelligent subjects than of the general population. Studies are still being conducted on Terman's sample, many of whom are now approaching the age of retirement. Sears (1977), for example, recently reported on patterns in their life satisfactions over time.

The most impressive group of broad-spectrum longitudinal studies were those begun in the San Francisco Bay area in the 1930s (see Eichorn's 1973 review of these studies). The first of these was the Berkeley Growth Study in which Nancy Bailey and Lotta Wolf studied a group of infants at repeated points in their lives until they were 40 years of age. Jean MacFarlane (1938, 1964) began a similar study a short time later, emphasizing variables reflecting adjustment relatively more than the Berkeley study. She also first identified subjects as infants and tracked their lives for 40 years. The last of the three studies was the Oakland Growth Study begun by Harold Jones (1939a, 1939b) which followed subjects from ages 10 to 50. This study also spanned 40 years of the subjects' lives. This immense wealth of data is now deposited at the Institute of Human Development (IHD) in Berkeley, California, where researchers continue to probe it for clues about the nature of the human condition over time. Volumes by Block (1971) and Haan (1972) are examples of some of the recent work conducted on these now-classic data banks.

In addition to being longitudinal in nature, all three studies were concerned with a comprehensive view of human behavior and each collected a wide range of data for study. Psychometric test data on the subjects' intelligence, physical aptitudes, and interests were collected in addition to a full battery of physical measures (for example, height, weight, sense organ sensitivity). A variety of projective and objective personality tests were also administered at various points during the time in which data were collected on these subjects. The children reared by the subjects in these studies became

secondary subjects both in their own right and also were studied as reflections of their parents' childrearing attitudes and practices.

Underlying the wide range of variables assessed is achievement--the construct of interest in the present study. Achievement was assessed by scores on several measures highly related to academic success, that is, intelligence, other tests of verbal skill and academic aptitudes, and by success in occupational or avocational areas. For example, financial success and prestige associated with occupational or career choice were assessed. Personality measures of morale, level of anxiety, work motivation, and interpersonal skill and satisfaction were also measured and related to questions about the subjects' general adjustment to life's demands.

Taken as a group, the major findings of these studies about the consistency of achievement over the years studied include:

1. First, the patterns of growth over time are extremely varied. Some individuals show a steady progression to greater relative achievement, while others show reduced levels of achievement later in their lives, failing to live up to initial expectations. Some individuals exhibited an inconsistent pattern of change in relative achievement over time, with achievement being higher at one point, lower at another, and average at other times. *For most of the subjects in these studies, however, their relative achievement remained roughly constant over the years studied.*

2. More continuity was observed on some dimensions of achievement than on others. Specifically, variables reflecting verbal fluency were the most consistent of the achievement-related measures, more so than overall IQ, for example.

3. Correlations between any variables over time increased with the age of the subjects and the closeness in time of the points of measurement.

4. Clusters of variables were often more predictive of later dimensions of achievement than were single variables.

5. Self-reports taken from adolescents were some of the strongest predictors of a variety of achievement behaviors (for example, educational attainment at young adulthood).

The classic longitudinal studies focus on a sample of subjects restricted to the upper-middle class, the Caucasian, and the well-educated--generally taken to be representative of our

population. Other racial, economic, and ethnic groups constituting the total American experience are not represented in these classic works. Thus, there is no way of knowing whether any of the findings of these studies holds for other groups. A major goal of this research is the examination of the validity of earlier findings for a rural southern population comprising blacks as well as whites.

This present study encountered theoretical complexities not present in the IHD studies, however. Particularly important is the issue of racial differences in achievement at different points in time and the relative ability of traditional measures of intelligence and achievement to predict later achievement for racial groups. Such issues are difficult to study objectively because of the ethical and political implications of this question in the contemporary culture.

RACIAL DIFFERENCES IN INTELLIGENCE AND ACHIEVEMENT

Many investigators have found that blacks score substantially lower on IQ tests--about one standard deviation--than whites (see reviews by Dreger and Miller, 1968; Loehlin, Lindzey, Spuhler, 1975; Samuda, 1975). Although the black-white discrepancy has been a frequent finding, the interpretation of racial differences in IQ scores is controversial. Investigators whose interpretations lean heavily on hereditary factors as the cause of the difference are opposed by those who find environmental factors to be most salient.

The hereditarian position rests on the argument that intelligence is largely an inherited capacity and that individual and group differences in intelligence are attributable primarily to genetic differences (Jensen, 1969). In particular, it is argued that black-white differences in IQ test scores--which are taken as covariant with innate intellectual ability--are due to genetic differences in the capacity for intelligent behavior of the type sampled by IQ tests and required for educational and occupational success.

Environmentalists, on the other hand, tend to view heredity as playing a less pivotal role than that assigned to it by Jensen. The reasons for this position vary. It is argued, for example, that the present state of research in behavioral genetics does not allow accurate estimates of genetic contributions to IQ test scores for blacks or whites. Additionally, Lewontin (1976) has stressed the fact that available knowledge regarding hereditability of human characteristics is based almost totally on white populations and may be inapplicable to blacks. Kamin

(1974, 1979) presented information that cast serious doubts on the integrity of data and methods used by Jensen to derive his estimates of hereditability. Other opponents of the hereditarian position argue against the equation of IQ test scores with inherited ability and find more distinctly environmental factors such as race discrimination, poverty, and reduced opportunity to be more compelling explanations of black-white differences in IQ. It should be noted that this controversy is not new, nor are the arguments. The same battle was fought by hereditarians and environmentalists in the 1920s and 1930s. At that time, however, the focus was primarily on explaining differences in IQ test scores associated with social class and national origin (Block and Dworkin, 1976; Kamin, 1974).

In this study we will present test data and school achievement scores for black and white adolescents. Our interest, however, is not in entering the heredity-environment debate described above. Rather, our interest is in the predictive value of intelligence and achievement test scores of black and white adolescents for later educational and occupational success. It will be of interest, for example, to see if test scores obtained in adolescence have the same pattern and strength of relationship to later achievement for blacks and whites. These analyses are especially timely because of recent interest in the differential use of standardized achievement tests and cutoff scores for the admission of blacks and whites to college and other training programs (Hixson and Epps, 1975).

THE BAUGHMAN-DAHLSTROM STUDY

Let us turn now to a brief review of the ability and achievement data collected on the eighth-grade sample that was originally studied in the mid-sixties by Baughman and Dahlstrom. The 1960 revision of the Stanford-Binet Test of Intelligence (S-B), form L-M, was administered individually to all children. In addition, a group test of intelligence, Thurstone Primary Mental Abilities Test (PMA) (Thurstone and Thurstone, 1962, 1965), and an academic achievement test, The Stanford Achievement Test (SAT) (Kelly, Madden, Gardner, Terman, and Ruck, 1953), were administered. On the Stanford-Binet the mean IQ score obtained by white children, 98, was very close to the expected mean IQ of 100, while the mean obtained by black children was 85, almost one standard deviation below the expected mean. Black girls obtained a slightly higher mean score (2 points) than did the boys; there were no meaningful sex differences for white children. The same pattern of race and sex differences was found for the PMA scores, although the differences were more pronounced.

Similar race differences were found on the Stanford Achievement Test, where scores are given in age equivalents. However, there was a sex difference in achievement of both black and white children. White girls were the only group that reached the normal expectation for age (National Educational Achievement [NEA]). They were followed by white boys (1 year below NEA), black girls (2 years below NEA), and black boys (3 years below NEA). A comparison of the Stanford-Binet IQ scores and the SAT scores revealed an interesting pattern: At the upper IQ levels white children had higher school achievement scores than black children of comparable ability, while at the lower end of the IQ continuum, white children had lower achievement scores than did black children of comparable ability. Baughman and Dahlstrom hypothesized that these inconsistencies were accounted for by the different teaching emphases in the then-segregated black and white schools; that is, black teachers appeared to address their efforts to slower students, while white teachers seemed to direct their attention to working with brighter students. Many detailed analyses and comparisons were made of the ability and achievement data; the reader is referred to Baughman and Dahlstrom (1968) for a complete description of all data analyses.

While we wish to make no assumption here about exact relationships among native ability, IQ test scores, and school achievement tests, it is important to note that these scores have been widely considered to be predictive of success in school as well as of success in extra-educational settings. The picture painted of the children studied in Millfield, with the possible exception of the white girls, was thus of a group educationally damaged and likely to have reduced chances for achievement and success in life.

MILLFIELD OF THE 1960s AND THE 1970s

"Millfield" designates a portion of a largely rural county in piedmont North Carolina. It covers an area approximately 10 miles square extending north from an interstate highway connecting several medium-sized manufacturing cities. The majority of Millfield is rural, consisting of small farms, occasional country stores and filling stations, and isolated small houses and mobile homes inhabited by families in which the breadwinners commonly commute to nearby textile plants. When studied by Baughman and Dahlstrom in the early 1960s, the median family income in Millfield was low (between $2,500 and $5,000), and the public schools were racially segregated. Two pairs of black and white schools, each located within one mile of the other, were

located at the northern and southern ends of the area under study. These four schools were the focus of their respective communities and, in that they were the site of the subject identification and most of the data collection, were the primary focus of the research of Baughman and Dahlstrom as well. Their eighth graders and the subjects of the study reported here would have completed their education through high school in these segregated schools.

By the time of followup ten years later, two of these four schools had been closed (one black and one white), and the other two had been racially integrated. Over the decade in question, black voter registration increased from 1,510 (or 29.3% of the potential black registration) in 1960 to 3,175 (or 52.9%) in 1970. Unlike much of rural North Carolina and the rural South in general, the population of Millfield increased by 16% during this period, and employment opportunities in nearby industrial towns and in two University communities 15 miles away increased as well.

In spite of the fact that median family income in 1970 was $7,442 and a significant proportion (15%) of the populace still lived below poverty levels, the area was, on the whole, economically healthy with below-average unemployment. Of special importance is the fact that much of the available employment in 1970 was of widely varying occupational statuses. Most of the positions in neighboring textile or tobacco concerns were of semi- or unskilled nature. By contrast, positions in the nearby university communities tended to be of a more white-collar or technical variety. Thus, the opportunities open to our subjects were diametrically opposed according to how much formal education was required for success and the restrictions on opportunity for achievement.

The civil rights movement and general questioning of cultural values that characterized the entire country during this decade also had its direct effects on formal social barriers, if not on the more subtle mores in Millfield. The schools and all public facilities were opened to all races and many of the visible remnants of the once rigid, two-class society faded into memory. Overt racism was clearly on the wane, and there were encouraging signs that more subtle forms of racism might continue to abate in the future as well. For example, a black man was elected to Millfield's county commission in 1972 and served in a powerful leadership role on the board for a number of years afterward.

The Millfield of the early 1960s had changed by the time of the follow-up study, in many ways faster than the county as a

whole. It was still a rural area with a significant degree of poverty, poor health care, and inadequate housing, but it had many more social, psychological, and health services for low-income families than had ever existed before. It was also a distinctly southern area with the positive qualities of friendliness and courtesy still widespread. Since this is a psychological and not a historical study, the social changes occurring in this decade are more important as a backdrop to studying the achievement shown in the individual lives than as objects of inquiry themselves. Although we can have only impressions about the impact of these social changes on the lives of our subjects, these changes will be important for us to consider in interpreting the correlates and predictors of achievement.

Chapter 2

RESEARCH DESIGN AND METHODS

The methods used in this follow-up study are a combination of necessity, chance, and choice. Because of the limited financial support available, necessity required that brief, structured interviews be used, often conducted by telephone; more intensive contact with the subjects was ruled out. In addition, the original research project on which this follow-up study was based was not originally designed as a longitudinal study. Hence, none of the procedures typically used to keep track of subjects over the years was instituted when the eighth graders were still readily accessible. Because Baughman and Dahlstrom were thorough and systematic in their data collection and storage, however, the opportunity for gathering new information was present. In addition, some procedures for finding subjects were developed as the data collection progressed, more as a function of trial and error than of planning. This was especially true of the methods used to locate difficult-to-find subjects.

The specific variables selected to assess and predict achievement reflect a comprehensive definition of achievement and range from standardized tests of achievement and intelligence to self-report data from subjects concerning a variety of indices of achievement and of other related life experiences such as migration patterns and family status. The follow-up variables present a consistent picture of our high- and low-achieving subjects. Our conclusions are, however, limited by methodological constraints inherent in the methods we used.

THE NATURE OF LONGITUDINAL RESEARCH

Longitudinal research offers significant advantages to the researcher interested in factors contributing to differences among people. Longitudinal methods are, in fact, essential to any serious study of the continuities of behavior over time; cross-sectional studies generate conclusions about which one can have only limited confidence. The advantages are aptly expressed in the following quotation from Harold Jones (1958):

> Longitudinal research has many practical disadvantages, but *it is the only way of obtaining evidence on the variety and stability of individual patterns* and of evaluating the possible role of both intrinsic and external factors in the process of growth and aging (p. 99) (emphasis added).

To study the stability of human attributes over time, repeated measures of the same subjects are essential. Conclusions about changes over time drawn from cross-sectional designs are subject to distortion resulting from generalizations based on group rather than individual statistics and from differences among cohorts raised in different eras.

As Jones suggests, however, longitudinal methods have serious, in fact, disheartening practical drawbacks. These are poetically portrayed by Dorothy Eichorn (1973) as "the apocalyptic horsemen of longitudinal research--death, disability, distance, and disinclination" (p. 303). Such studies are financially expensive. They require a great deal of personal commitment to maintain the necessary emotional investment and energy over a number of years. They are exceedingly slow to produce results, and they are plagued by subject loss from a variety of causes which are not under the control of the investigators. Above all, they require tremendous patience of the investigator. In addition to their difficulty in execution, conclusions drawn from longitudinal designs are also prone to distortion due to subject loss (Labouvie *et al.*, 1974), especially when subjects leave the study voluntarily. The fact that longitudinal methods have not been employed in the majority of studies of developmental issues is to a large degree a testament to their difficulty. We, however, share the belief that the theoretical advantages of studying persons over time outweigh the pitfalls.

FOLLOW-UP TECHNIQUES

Between June of 1972 and August of 1973, an attempt was made to locate and interview each of the 262 eighth-grade subjects of Baughman and Dahlstrom using a structured interview (see Appendix). This instrument was suitable for face-to-face or telephone contacts and asked for detailed information about the subjects' lives during the 10 years since they were in the eighth grade.

Several techniques were used to locate subjects for the follow-up interviews. The initial procedure was to examine

school records in the inactive files of the county school system. Records for most of the subjects were obtained in this way, although they were not available for subjects who changed school systems after the eighth grade. In addition, some records were apparently misplaced when the black and white schools were integrated in the late 1960s. School records were also helpful in providing the names, addresses, and occasionally telephone numbers of the subjects' parents or guardians. With the names of the subjects and their parents in hand, the laborious process of searching telephone books for local and neighboring telephone districts began. When the current telephone number and address was found, a letter was sent informing the subject or the parents about the follow-up study and saying that an interviewer would be calling to ask for his or her participation. A week later, an interviewer called; if the subject was located and agreeable, the follow-up questionnaire was administered or a suitable time for calling back or visiting the home was arranged. If subjects were unavailable, the interviewers sought information about how to locate them. The three interviewers were advanced graduate students in psychology and anthropology; two of the three were female and all were white.

This follow-up procedure had several inadequacies. For example, many subjects and their parents did not have telephones, and most of the calling had to be done in the evenings or on weekends due to work schedules of the subjects. Some relatives seemed to believe that the interviewers were interested in locating subjects for reasons other than the stated purpose, and they either gave no information or (we presume) deliberately false information about the whereabouts of the subjects. For the most part, however, the persons contacted were cooperative and helpful and most of the subjects were successfully found by these means.

Once the majority of subjects had been located using these initial methods, finding additional subjects was more difficult and required the use of other methods. For example, if the subjects and their parents had no telephone listing, persons with identical surnames were called in the hope that a relative would be found who could provide needed information. Since there were large numbers of people with identical family names in Millfield and surrounding areas, this was an often laborious process, but it did lead to the location of a few subjects. County tax listings were also examined for parents' addresses if no telephone listings were found, but this approach was not particularly fruitful. Two of the most successful techniques for locating otherwise lost subjects were searching employee listings of the major employers in the area and visiting previously located subjects or residents of long standing in neighborhoods to ask for

information they might have about still unlocated subjects. This latter method was particularly useful in learning the married names of female subjects, making the continued search for them considerably easier.

FOLLOW-UP QUESTIONNAIRE

The follow-up interview schedule (see Appendix) was designed to provide measures for three indices of achievement and a variety of other attributes and historical facts about the subjects. The interview took approximately 30 minutes to complete. While we were primarily concerned with predicting achievement as measured by education, occupation, and income, a variety of other moderator variables were also assessed, not because they were thought to be direct reflections of how well an individual was succeeding, but because of the *moderating roles* they would likely have on the three direct measures of achievement. For example, questions concerning the number of jobs an individual had held, a listing of the places he or she had lived, a report of marital and parental status, and information about the degree of civic- and church-related activity at the time of the followup were also requested.

Questions about 2 sensitive areas and 22 specific health-related questions, the Health Opinion Survey (HOS), were included at the end of the interview. Subjects were asked about their history of arrests or convictions for crimes and of treatment for psychological difficulties. The HOS items appear to be concerned with general physical health to the casual observer, although they were in fact designed to assess the basic symptoms of depression and anxiety (for example, disturbances in sleep or eating).

LIMITATIONS OF THE SELF-REPORT DATA

Because all of the follow-up data and much of the predictor data were gathered by self-report methods, it is conceivable that the data could have been distorted by subjects' desires to present socially desirable pictures of themselves. However, since most of the information sought was innocuous, relatively objective, or public (school attendance, for example), it seems unlikely that motivation to deceive was aroused by the follow-up interview. Even though some of the information touched on sensitive personal areas (such as legal difficulties or psychiatric treatment), questions pertaining to those areas were left until the end of the interview; the interviewers were convinced that subject trust and cooperation was sufficient to overcome any

hesitancy to respond straightforwardly. Some support for the accuracy of the information gathered is provided by the fact that no one refused to participate in the study and only one subject requested that the interview be terminated before completion. Research on survey interview methods (Kahn and Cannel, 1957) has shown that distortions of the accuracy of objective data resulting from factual error and social desirability is not serious enough to negate results garnered from them. Therefore, while the limitations of self-report data should be kept in mind, they do not seem to raise serious questions about the conclusions of this study.

SUCCESS OF FOLLOWUP

The follow-up procedures successfully located and collected data from 175 or 67% of the 262 eighth-grade subjects. No one located refused to participate; five subjects were found to be deceased. The race and sex of the original and located subjects are presented in Table 2.1. More whites (75%) than blacks (60%)

TABLE 2.1. FREQUENCIES AND PERCENTAGES OF ORIGINAL SAMPLE AND LOCATED SUBJECTS BY RACE AND SEX

	TOTAL	LOCATED
MALES	118 (45%)	81 (69%)
Black	61 (23%)	37 (61%)
White	57 (22%)	44 (77%)
FEMALES	144 (55%)	94 (65%)
Black	83 (32%)	50 (60%)
White	61 (23%)	44 (72%)
TOTAL	262 (100%)	175 (67%)
Black	144 (55%)	87 (60%)
White	118 (45%)	88 (75%)

were located, but the follow-up success for males (69%) and females (65%) was quite similar. The absolute number of black males located was the smallest (37) of the four groups and black females the largest (50). White males and females were located more successfully than blacks, and the lower number of black

males and higher number of females reflect differences in the original sample rather than follow-up bias.

PREDICTOR AND FOLLOW-UP VARIABLES STUDIED

Baughman and Dahlstrom collected a comprehensive range of psychological and sociological data on their subjects. From this potential set of variables, 9 variables were chosen as predictors for comparison with 13 variables developed from the follow-up data. The specific predictor variables were chosen primarily because previous longitudinal research suggested consistencies in these attributes over time and because they seemed likely to be related to indices of subsequent achievement. Stanford-Binet Intelligence Scale and Minnesota Multiphasic Personality Inventory (MMPI) scores, for example, were included for this reason. The set of predictor variables was also chosen in part because some of the relevant data collected by Baughman and Dahlstrom unfortunately were incomplete (for example, projective-test/achievement-theme scores). In other cases, when different variables were quite similar in content and highly correlated (such as the Stanford-Binet Intelligence Scale and the Primary Mental Abilities Test), the measure with the greatest demonstrated validity (the Stanford-Binet, in this case) was selected. Data from the MMPI and from the Stanford Achievement Test presented special problems because too many potential scores were available to be easily compared with other variables. A single summary index of the 16 basic MMPI scales, the Cooke Psychopathology Index (Cooke, 1967a, 1967b), was adopted to condense the scores into one general index of psychological disturbance. Similarly, the battery median was selected from the 5 specific subtests on the Stanford Achievement Test.

PREDICTOR VARIABLES

The predictor variables are divided into four areas: FAMILY BACKGROUND, PERSONAL ATTITUDES, INTELLECTUAL MEASURES, and PERSONALITY MEASURES. Baughman and Dahlstrom gave a lengthy interviewer-administered questionnaire to their eighth-grade subjects. This 1960 questionnaire contained 115 questions dealing with a wide variety of family background information and attitudes toward self and community. The six variables selected from this questionnaire, the SAT battery median, and the MMPI measures used for predictor variables are described below. Other items were not used because of overlapping content or a limited range of responses.

FAMILY BACKGROUND

1. *Breadwinner's occupational level*--a modified Hollingshead and Redlich (1958) 1- to 5-point scale of social status with professional and managerial jobs receiving the highest rating (#1) and laborers receiving the lowest (#5). (Note: Higher values on this scale represent *lower* status jobs.)

2. *Mother's educational attainment*--total years of formal schooling of subjects' mothers. Father's education was not used because of its high correlation with mother's education and the smaller number of subjects whose questionnaire reported data about fathers.

3. *Number of children in family of origin*--indicated by the number of siblings (plus 1) a subject reported having.

PERSONAL ATTITUDES

4. *"How far would you like to go in school?"* (desired education)--a 1- to 5-point scale, with #1 indicating a desire to stop in elementary school and #5 a desire to attend college or professional school.

5. *"Do you want to live in the Millfield area when you're grown?"* (desire to live in home community)--a 5-point scale with #1 representing a "definitely not" response and #5 a "definitely yes" response.

6. *"Are you pretty much satisfied with the sort of person you are?"* (satisfaction with self)--a 5-point scale with #1 representing a "very satisfied" response and #5 a "very dissatisfied" answer. (Note: Higher scores on this scale represent *less* satisfaction with self.)

INTELLECTUAL MEASURES

7. *Stanford Achievement Test battery median*--a pencil-and-paper test consisting of measures of the five following academic skills: word meaning, spelling, language usage, arithmetic reasoning, and arithmetic computation. Only the battery median, a score representing a subject's typical performance, was used in this study. The battery median scores are presented in age equivalents X 10 (that is, the average battery median score for all subjects was 130.5, or thirteen years of age) and give a single index of how a subject's typical performance on these

measures of academic skill compares with the typical performance of other children of the same age.

8. *Stanford-Binet Intelligence Scale*--an individually administered test primarily measuring verbal cognitive skills and producing intelligence quotients (IQs) with a mean of 100 and a standard deviation of 16.

PERSONALITY MEASURES

9. *Minnesota Multiphasic Personality Inventory*--the most frequently used self-administered measure of personality and psychopathology (Dahlstrom, Welsh, Dahlstrom, 1972, 1975). Because of the large number of scale scores produced by the MMPI, the Cooke Psychopathology Index was selected as a weighted combination of the 16 basic scales. The Cooke Index was developed and cross-validated against expert judgments as to whether a given MMPI profile represented significant psychopathology. Thus, a high score on the Cooke index indicates that MMPI experts would be likely to judge a subject's profile to be a pathological one.

FOLLOW-UP VARIABLES

Achievement, the major construct in this study, is seen as a multifaceted psychological concept reflecting (1) an individual's degree of ability or talent relative to others, (2) his or her choice of goals toward which to apply that ability, and (3) his or her likelihood of persevering toward a goal in the face of obstacles. Opportunity combines with these psychological concepts to produce an individual's overall degree of financial success.

Achievement was assessed by three related variables--EDUCATIONAL ATTAINMENT, OCCUPATIONAL LEVEL, and INCOME. Educational attainment refers to the total number of years of formal education a person had received. In computing this variable, years in technical or business school were given equal weight to years in a college or university curriculum. Time spent in isolated workshops or training programs not offered as part of formal degree or certificate programs, however, was not added to a person's score on this variable. Occupational level is a simple, five-point rank ordering of job status similar to the Hollingshead and Redlich (1958) scale that combines education and job status into a scale reflecting community perception of a person's social status. Only the occupational rankings were used

in the occupational level variable in that a separate measure of education was used. Income was measured by subjects' reports of the income they received each week before deductions. For salaried employees reporting monthly income, figures were multiplied by 12 and divided by 52 to produce a comparable weekly figure. Although these three measures of achievement were expected to be correlated, certain considerations guided their choice as primary outcome measures.

The three separate measures of accomplishment in life--education, occupation, and income--were chosen for the unique elements each brings to a composite construct of achievement. Educational attainment reflects academic ability, but also the decision to participate in academic activities, and the perseverance to spend time in the often frustrating and anxiety-arousing activities of formal schooling when the attractions of full-time work or family life beckon. Although educational attainment is not a pure measure of academic skill, it is highly influenced by pure ability at intellectually oriented tasks. Persons finding such activities relatively easy will be more likely to find them pleasurable and to spend time at them. Ample evidence for the converse of this statement is also available in any school setting among the disheartened students for whom academic activities offer little but frustration and a sense of failure.

Because it combines ability and motivational elements, educational attainment was chosen as a measure of achievement in this study rather than other available alternatives. Even if administering standardized academic achievement tests had been financially feasible, the motivational aspects of the construct would have been lost. Occupational level is, of course, heavily influenced by education, but it also adds the element of choice, as well as the image an occupation holds for an individual, factors also affecting his or her selection of that vocation.

Income, as a separate measure of achievement, is, of course, correlated with both education and job level, but it adds unique variance associated with opportunity. Some jobs pay relatively better or relatively worse than one would predict based on their educational requirements or status alone. In fact, for many persons, a "good job" is one that pays well, pure and simple. Thus, each of the measures of achievement is related to the others, but each also contains additional elements reflecting ability, choice, perseverance, and opportunity. In predicting these criteria and in comparing continuities over time, the achievement variables will be examined both separately and together in an attempt to tease out the relative contribution of each.

Other information on the follow-up questionnaire was used to produce scores on the 11 MODERATOR VARIABLES included in the analyses. As was true with the array of available predictor information, the final choice of items was influenced by a variety of factors. Some of the follow-up information, as would be expected, lacked sufficient variability for quantitative analysis. Too few subjects had served in the military to use variables such as length of service or final rank attained. Participation in civic or church activities was similarly limited. In addition, the number of persons reporting arrests (9), convictions (8), or psychiatric treatment (15) was too small to allow serious analysis of these data separately. A description of the final set of 14 follow-up variables is as follows.

ACHIEVEMENT INDICES

1. *Educational attainment*--the total number of years a subject attended school. Years in technical or business school were given parity with years in college in computing these scores.

2. *Occupational level*--a 5-point scale identical to the one used to classify breadwinner's occupational level above, with #1 representing high status jobs and #5 low status ones.

3. *Weekly income*--a 7-point scale in $50 intervals from less than $50 to more than $300 per week, gross individual (not family) income.

MODERATOR VARIABLES

4. *Number of jobs*--the total number of jobs held by a subject since stopping school. Part-time jobs during school and military positions were excluded because they would have inappropriately inflated this figure for some subjects.

5. *Job change index*--an index computed by dividing the total number of jobs (variable #4) by the number of years since starting work. It represents the rate at which a person changes jobs, with higher scores indicating more frequent job changes.

6. *Number of places lived*--the total number of places in which a subject lived since leaving home, finishing school, or completing military service.

7. *Change of residence index*--the ratio of the number of places lived to the number of years since leaving home, school, or the military. Like the Job Change Index, it reflects how often a person had changed his or her place of residence. Higher scores indicate more frequent change.

8. *Moving pattern*--a categorical scale consisting of 11 patterns of moving behavior, including never leaving home, leaving home for schooling or military service and then returning, leaving home to marry, leaving home for a period of time to work elsewhere and then returning. The categorical nature of this variable prohibited its inclusion in the correlational analyses reported. To facilitate analyses using this scale, the categories were also collapsed into two groups, those staying at home (or returning home) and those leaving home and not returning. Analyses of mean differences for these groups are reported.

9. *Farthest distance from home*--a 4-point scale reflecting the farthest distance from Millfield that a subject had ever lived since leaving home. Places visited on vacations or while in military service were excluded from this scale. The four points on this scale are (a) less than 50 miles from Millfield, (b) in North Carolina, (c) east of the Mississippi River, and (d) west of the Mississippi or in a foreign country. Because most of the located subjects lived within 50 miles of Millfield, this scale was simplified into having resided in-state versus having resided out-of-state for some analyses.

10. *Urban/rural environment*--subjects' ratings of their present living environment on an urban/rural dimension using the following four points: (a) large city; (b) small town; (c) non-farm, rural area; and (d) farm. For some analyses, this scale was divided between small town and non-farm/rural area into the two categories called urban and rural environment. Although the small town, by objective standards, would not usually be considered an urban environment, it is considered urban for this population.

11. *Marital status*--this 5-point qualitative scale contains the following categories: single, married, separated, divorced, and married more than once. Marital status is not included in correlational analyses, but some analyses group subjects into single and married; there were too few cases in the divorced or separated categories to form a group of subjects with disrupted marriages. Subjects' age at first marriage is included in some analyses.

12. *Rate of childbearing*--a fertility index computed by dividing the number of children a subject has by the number of years he or she has been married. Thus, a rate of 0 would mean no children, a rate of 1.00 would indicate producing children at the rate of one per year, with all other rates in between. This fertility index was selected because the subjects and their spouses were still in the active child-producing period of their lives when studied and no measure of their overall or eventual fertility could be used.

13. *Number of children*--the total number of children individual reported having thus far.

14. *Health Opinion Survey (HOS)*--a 22-item questionnaire developed for use as a screening tool in field studies of the epidemiology of psychiatric disorders (Leighton, Leighton, and Danley, 1966). Most of the items deal with the common physical symptoms of anxiety and depression, but without being so labeled. (Items 20 to 41 on questionnaire in Appendix.)

DESCRIPTION OF THE FOLLOW-UP SAMPLE

The ranges of achievement indices on the 175 subjects contacted in the early 1970s were about what one would expect from a heterogeneous sample of young adults raised in rural and relatively unaffluent surroundings. Ten had dropped out of school after the eighth grade or after his/her sixteenth birthday, as soon as the law in North Carolina allows. Most had finished high school, many had completed college, and a small minority were still in college or had received degrees from graduate or professional schools. Table 2.2 presents means and ranges for the achievement variables for the four race and sex groupings. The mean educational attainment scores were almost identical across the four groups, all falling near the high school graduation mark. Occupational-level scores appear to reflect a slight racial difference, both white men and women holding jobs of relatively higher status than blacks. Black males appeared to hold lower level jobs than did the other three groups. Weekly income, however, shows the most striking group differences. Blacks earned less money than whites and women less than men.

Descriptive data for all subjects are presented in Table 2.3 for the predictor variables and in Table 2.4 for the follow-up variables. The average subject was from a working-class family with between 5 and 6 children and had a mother who had gone to school for 9½ years. Subjects showed an average educational achievement typical of that shown by 13-year-olds even though

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TABLE 2.2. MEANS AND RANGES FOR YEARS OF EDUCATION, OCCUPATIONAL LEVEL, AND WEEKLY INCOME OF LOCATED SUBJECTS BY RACE AND SEX

	Education			Occupation			Income		
	Mean	Range	*N*	Mean	Range	*N*	Mean	Range	*N*
Black Males	12.2	8-18	37	3.5	1-5	36	$123	$50-250	33
Black Females	12.0	8-18	50	3.3	1-5	48	$ 99	$50-250	34
Blacks	12.2	8-18	87	3.4	1-5	84	$111	$50-250	67
White Males	12.0	8-16	44	3.1	1-5	44	$146	$50-300+	42
White Females	12.4	8-16	44	3.1	1-4	42	$116	$50-250	27
Whites	12.2	8-16	88	3.1	1-5	86	$134		69
All Youth	12.1	8-18	175	3.2	1-5	170	$123	$50-300+	136

Note: The smaller N's for income than for education are a result of unemployment.

the subjects were, on the average, 14 years old at the time. The range was wide on the achievement test scores, between 8½ years of age to 18 years. The Stanford-Binet IQ scores, as Baughman and Dahlstrom note in their volume, were, on the average, 10 points below the national norm (sample mean = 90.5) and ranged from the mildly retarded (lowest IQ = 57) to the superior levels (highest IQ = 128). The average MMPI profile showed moderate elevation, a finding demonstrated in the average Cooke Psychopathology Index of 543, a figure only 13 or so points below Cooke's cutoff for a pathological profile. Thus, the summary data on the predictor variables reiterate the portrait drawn by Baughman and Dahlstrom about the subjects at the time they were in the eighth grade.

The typical subject had had 2.6 jobs, had lived in 2.2 places since the eighth grade, and, if he or she was married, did so, on the average, at 19.1 years of age. The mean Health Opinion Survey score of 25.8 is in what is considered to be the range of scores to be expected from relatively comfortable, nonpathological individuals (see Leighton *et al.*, 1966). Thus, the subjects' scores on the moderator variables appear generally unremarkable. The relationship of individual moderator variables on achievement may prove to be more revealing.

TABLE 2.3. DESCRIPTIVE STATISTICS FROM LOCATED SUBJECTS ON PREDICTOR VARIABLES

Predictor Variables	Range	Mean	SD	N
FAMILY BACKGROUND				
Breadwinner's occupational level	1-5	3.16	1.15	116
Mother's education	4-18	9.56	2.55	110
Number of children	1-18	5.65	3.32	121
PERSONAL ATTITUDES				
Desired education	1-5	2.98	1.13	122
Desire to live in home community	1-5	2.50	1.54	121
Satisfaction with self	1-4	3.25	.74	122
INTELLECTUAL MEASURES				
Stanford Achievement Test	85-138	130.5	21.3	109
Stanford-Binet IQ	57-128	90.5	15.2	96
PERSONALITY MEASURES				
MMPI Pathology Index	342-984	543.2	99.5	261

STATISTICAL COMPARISONS OF SAMPLE SUBGROUPS

A primary concern in any follow-up study is the presence of systematic bias in the kinds of subjects successfully located. The slightly greater success in locating white versus black subjects in this study has already been noted. In order to explore the possible existence of other such biases, tests of significance were computed for each of the predictor variables between located and missing subjects. Results from these tests are presented in Table 2.5. Only one of the 10 t tests reached significance; the missing subjects had significantly higher Cooke pathology indices than the located ones. Even though this mean difference was a small one in a series of nine multiple tests, the possibility must be considered in interpreting the results that the located subjects may have been less disturbed when

TABLE 2.4. DESCRIPTIVE STATISTICS FROM LOCATED SUBJECTS ON FOLLOW-UP VARIABLES

Follow-up Variables	Range	Mean	SD	N
ACHIEVEMENT				
Educational attainment	8-18	12.1	2.2	175
Occupational level	1-5	3.3	.9	170
Weekly income	1-7	2.9	1.1	136
MODERATOR				
Number of jobs	0-8	2.6	1.5	168
Job change index	0-2	.76	.44	167
Number of places lived	1-8	2.2	1.5	175
Change of residence index	10-6	.66	.73	164
Farthest distance lived	0-4	1.4	.9	174
Urban/rural environment	1-4	2.8	1.1	172
Age of first marriage	15-24	19.1	2.0	117
Number of children	0-4	.97	.94	130
Rate of childbearing	0-2	.16	.14	116
Health opinion survey	20-46	25.8	4.4	173

eighth graders than the missing subjects. In addition, mean differences for some of the other eight tests were in the direction of more favorable scores for found subjects. The results are to be interpreted in light of the very real possibility that unlocated subjects were systematically less successful than those we were able to locate.

In addition, 22 two-way analysis of variance tests were computed comparing race-and-sex on each of the 9 predictor and the 13 follow-up variables. These tests were performed to examine the strength of the apparent mean differences between these groups and to estimate the probability that they could have occurred by chance alone. Table 2.6 presents summary *F* values for these tests on the predictor variables and Table 2.7 displays

TABLE 2.5. TESTS OF SIGNIFICANCE BETWEEN LOCATED AND MISSING SUBJECTS ON PREDICTOR VARIABLES

	Located Subjects		Missing Subjects				
Predictor Variables	Mean	S.D.	Mean	S.D.	*df*	*t*	two-tailed *p*
FAMILY BACKGROUND							
Breadwinner's occup. level	3.19	1.16	3.09	1.15	114	0.42	0.67
Mother's education	9.69	2.44	9.25	2.81	108	0.83	0.41
Number of children	5.72	3.52	5.49	2.83	120	0.35	0.73
PERSONAL ATTITUDES							
Desired education	3.04	1.12	2.86	1.11	120	0.78	0.44
Desire to live in home community	2.60	1.58	2.27	1.45	119	1.07	0.29
Satisfied with self	3.25	0.72	3.27	0.80	120	-0.16	0.88
INTELLECTUAL							
Stanford Achievement Test	132.01	22.33	126.71	18.24	107	1.17	0.24
Stanford-Binet IQ	91.46	15.78	88.11	13.50	94	0.97	0.33
PERSONALITY							
MMPI Pathology Index	532.83	98.02	563.90	99.81	259	-2.40	0.02

TABLE 2.6. F-TEST SCORES FOR ANALYSIS OF VARIANCE ON PREDICTOR VARIABLES BY RACE AND SEX

Predictor Variables	Sex	Race	Interaction
FAMILY BACKGROUND			
Breadwinner's occupational level	.91	.13	.00
Mother's education	1.51	2.89	1.73
Number of children	3.06	18.74†	.77
PERSONAL ATTITUDES			
Desired education	2.81	5.52*	.14
Desire to live in home community	3.64	3.40	2.29
Satisfaction with self	.20	.07	4.61*
INTELLECTUAL MEASURES			
Stanford Achievement Test	4.84*	19.23†	.68
Stanford-Binet IQ	.88	15.65†	.08
PERSONALITY MEASURES			
MMPI Pathology Index	23.11†	2.59	.00

*$p < .05$.

**$p < .01$.

†$p < .001$.

summary data for the follow-up variable tests. These tables show significant sex differences on the Stanford Achievement Test (females scores higher than males) and on the MMPI Psychopathology Index (males appeared more disturbed). Several predictor variables revealed significant race effects--blacks coming from relatively larger families, reporting more desired education, and scoring less well on both the Stanford Achievement Test and the Stanford-Binet Intelligence Scale. The data in

TABLE 2.7. F-TEST SCORES FOR ANALYSIS OF VARIANCE ON FOLLOW-UP VARIABLES BY RACE AND SEX

Follow-up Variables	Sex	Race	Interaction
ACHIEVEMENT			
Educational attainment	1.27	.03	1.21
Occupational level	.07	5.01*	.42
Weekly income	9.54**	6.79**	.38
MODERATOR			
Number of jobs	3.64	2.83	.61
Job change index	4.78*	.81	.02
Number of places lived	.03	1.99	.68
Change of residence index	.08	.14	1.69
Farthest distance lived	.38	4.19*	.09
Urban/rural environment	.09	.14	.06
Age of first marriage	8.31**	.31	.03
Number of children	6.95**	6.57*	.08
Rate of childbearing	3.45	7.39**	.00
Health Opinion Survey	.93	.06	.09

*$p < .05$.

**$p < .01$.

Table 2.7 indicate females received less income than males, changed jobs less often, were younger when they married for the first time, and had more children by the time of followup. Blacks reported relatively lower-status jobs providing them with less income at the time of the followup. They also reported being less likely to live far from home. The two follow-up variables related to fertility, absolute number of children and rate of childbearing, were both higher for black subjects than for whites.

The race and sex differences were not particularly surprising. Most were consistent with previous data indicating blacks and women occupy jobs offering less community status and financial remuneration and that both groups are also likely to begin families earlier.

Thus, while the group of located subjects is not substantially different from the missing subjects on predictor variables, observed differences by race and sex on follow-up variables are consistent with expectations for lower achievement levels for females and blacks on the measures employed here. The impact on achievement of these differences of family background, intellectual ability, and personal attitudes and personality adjustment as well as migration and marital status and related variables is explored in Chapters 3 and 4. In a deliberate search for redundancy, as Block (1971) and others report, we subjected our data to different approaches of data analysis. The correlational analyses presented in Chapter 3 and analysis of variance approach in Chapter 4 also reveal similar findings regarding the course of achievement through the adolescent years to young adulthood for white males and females and black males and females.

Chapter 3

CORRELATIONAL ANALYSES

In order to understand the eighth-grade factors that are significantly associated with indices of achievement at young adulthood, we will explore interrelationships between individual predictor variables, among the predictor and follow-up variables, and between the two sets of variables over time.* Correlation matrices for all subjects and for subjects grouped by race and sex are examined for clusters of significant correlations. A stepwise regression analysis is applied to determine the relative ability of weighted combinations of eighth-grade data to predict the achievement indices. These statistics are used to describe the relative success of subjects at these two different periods of their lives and to generate explanations for the degree of consistency over time. This overview permits an estimate of the extent to which the achievement variables measure similar or unique things and aid in understanding the kinds of moderator variables associated with each of them.

Patterns and predictions over time are determined by correlations between each of the 3 measures of achievement--educational attainment, occupational level, and income--and the 9 predictor variables--breadwinner's occupational level, mother's educational attainment, number of children in family of origin, "How far would you like to go in school?" (desired education), "Do you want to live in the Millfield area when you're grown?"

*Although follow-up data were collected for 175 out of 262 subjects, the number of subjects for analyses of these data is smaller and varies across variables. Missing data are primarily in the predictor data; the eighth-grade data are complete on every variable for only 123 out of 262 subjects, due to such factors as absenteeism and time needed to complete the tests. Although complete predictor and follow-up data are available for only 85 subjects, analyses using many of the predictor variables are based on much larger samples. Sample size also varies because some predictor and follow-up variables are not equally applicable to all subjects (for example, father's education when no father is known or age at first marriage when a subject is unmarried). The problem created by missing data was relatively less serious when analyses were made of all subjects, but it did restrict some of the analyses for the four race and sex groupings as the N's (especially for black males) for some variables were reduced to below 15. Some data in the results chapters therefore, are interpreted guardedly.

(desire to live in home community), "Are you pretty much satisfied with the sort of person you are?" (satisfaction with self), Stanford Achievement Test Battery median, Stanford-Binet Intelligence Scale, and the Minnesota Multiphasic Personality Inventory. This allows both an evaluation of the relative ease with which each of the 3 outcome variables can be predicted over 10 years' time and the relative ability of the predictor variables to predict any of the measures of achievement. Predictive relationships between the eighth-grade variables and the moderator follow-up variables are examined in an attempt to further evaluate what role they play as mediators to achievement. The final correlational analysis is a stepwise regression procedure using the 9 predictor variables to predict each of the 3 achievement variables. This analysis rank orders those variables selected from the eighth-grade data in terms of *how well* and *how uniquely* each accounts for variance in achievement.* One of the moderator variables--rate of childbearing--proves to be highly related to the other achievement indices. Therefore, the regression technique is applied to this variable as well in order to explore factors associated with this aspect of our subjects' lives over time.

CORRELATION MATRICES

AMONG PREDICTOR VARIABLES

The intercorrelations of the predictor variables are presented in Tables 3.1-3.5. An initial glance at the matrix of 36 correlation coefficients in Table 3.1 reveals that many of the variables have moderately high correlations--greater than one would expect by chance alone given the number of observations and the number of coefficients. For example, 14 of these 36 coefficients were significant beyond the .05 level and 6 beyond the .001 level. The highest coefficient in the matrix (.73) is between the Stanford Achievement Test and the Stanford-Binet Intelligence Scale--a not unexpected finding given the similarity of these scales in content and construction.

The 14 significant correlations can be seen to correlate fairly consistently with the two intellectual variables in a reasonable and predictable way, forming a strong cluster or group of related variables. For example, both the Stanford-Binet and the Stanford Achievement Test correlate negatively with two of the family background variables: breadwinner's occupational level and number of children in family of origin.

*Recall that higher values on this scale represent lower status jobs.

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TABLE 3.1: CORRELATION MATRIX OF PREDICTOR VARIABLES FOR ALL SUBJECTS

PREDICTOR VARIABLES	FAMILY BACKGROUND			PERSONAL ATTITUDES			INTELLECTUAL		PERSONALITY
	Breadwinner's occup. level	Mother's education	Number of children in family of origin	Desired education	Satisfaction with self	Desire to live in home community	Stanford Achievement Test	Stanford-Binet IQ	MMPI-Pathology Index
FAMILY BACKGROUND									
Breadwinner's occup. level		-.08 (107)	-.15 (116)	-.10 (116)	.00 (116)	.07 (115)	-.21* (103)	-.22* (91)	-.06 (115)
Mother's education			-.36† (110)	.15 (110)	.04 (110)	-.02 (109)	.25* (97)	.19 (84)	-.19* (109)
Number of children in family of origin				-.15 (122)	-.07 (122)	-.12 (121)	-.43† (109)	-.43† (96)	.23** (121)
PERSONAL ATTITUDES									
Desired education					.12 (122)	-.09 (121)	.44† (109)	.30** (96)	-.13 (121)
Satisfaction with self						.09 (121)	.04 (109)	.05 (96)	-.13 (121)
Desire to live in home community							.01 (109)	.20* (96)	-.01 (120)
INTELLECTUAL									
Stanford Achiev. Test								.73† (96)	-.32† (108)
Stanford-Binet IQ									-.32** (95)
PERSONALITY									
MMPI-Pathology Index									

NOTE: Number in parentheses is the number of subjects for this coefficient.
**p < .05.*
***p < .01.*
†p < .001.

(Stanford-Binet correlates -.22 with occupational level and -.43 with number of children; Stanford Achievement correlates -.21 with occupational level and -.43 with number of children.) Both intellectual variables correlate significantly with the subject's desired education (Stanford-Binet, .30 and Stanford Achievement, .44) and negatively with the MMPI psychopathology index (both variables correlate -.32 with the MMPI index). Only three significant coefficients in the matrix are not part of this cluster. One is the intercorrelation between mother's education and number of children in family of origin (-.36); the other two are between the MMPI pathology index and each of these

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TABLE 3.2: CORRELATION MATRIX OF PREDICTOR VARIABLES FOR WHITE MALES

PREDICTOR VARIABLES	FAMILY BACKGROUND			PERSONAL ATTITUDES			INTELLECTUAL		PERSONALITY
	Breadwinner's occup. level	Mother's education	Number of children in family of origin	Desired education	Satisfaction with self	Desire to live in home community	Stanford Achievement Test	Stanford-Binet IQ	MMPI-Pathology Index
FAMILY BACKGROUND									
Breadwinner's occup. level		-.26 (19)	.00 (21)	-.31 (21)	.18 (21)	.31 (21)	-.12 (18)	-.13 (18)	-.1⅓ (21)
Mother's education			-.45 (19)	.47 (19)	.16 (19)	-.20 (19)	.27 (16)	.43 (16)	-.32 (19)
Number of children in family				-.38 (22)	-.15 (22)	-.02 (22)	-.33 (19)	-.51 (19)	-.04 (22)
PERSONAL ATTITUDES									
Desired education					.06 (22)	-.14 (22)	.72** (19)	.72** (19)	-.20 (22)
Satisfaction with self						-.21 (22)	.00 (19)	.17 (19)	-.62* (22)
Desire to live in home community							.26 (19)	.21 (19)	.22 (22)
INTELLECTUAL									
Stanford Achiev. Test								.79** (19)	-.06 (19)
Stanford-Binet IQ									-.20 (19)
PERSONALITY									
MMPI-Pathology Index									

NOTE: Number in parentheses is the number of subjects for this coefficient.
*$p < .05$.
**$p < .01$.
†$p < .001$.

variables (pathology with mother's education -.19, and with number of children, .23).

Thus, 9 predictor variables were significantly intercorrelated in a conceptually reasonable and consistent way. For example, the 2 measures of academic ability--general intelligence and academic achievement--were positively correlated with each other, and each was also positively associated with one personal attitude--the subjects' desire for further schooling. Therefore, academic ability and desire for education were positively associated. The ability measures were negatively correlated

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TABLE 3.3: CORRELATION MATRIX OF PREDICTOR VARIABLES FOR WHITE FEMALES

PREDICTOR VARIABLES	FAMILY BACKGROUND			PERSONAL ATTITUDES			INTELLECTUAL		PERSONALITY
	Breadwinner's occup. level	Mother's education	Number of children in family of origin	Desired education	Satisfaction with self	Desire to live in home community	Stanford Achievement Test	Stanford-Binet IQ	MMPI-Pathology Index
FAMILY BACKGROUND									
Breadwinner's occup. level		-.08 (29)	-.19 (29)	.01 (29)	-.02 (29)	.01 (29)	-.30 (28)	-.04 (26)	-.28 (29)
Mother's education			-.35 (29)	.37 (29)	-.09 (29)	-.15 (29)	.36 (28)	.19 (26)	.18 (29)
Number of children in family of origin				-.48* (27)	-.41 (29)	.22 (29)	-.26 (28)	-.35 (26)	-.11 (29)
PERSONAL ATTITUDES									
Desired education					.19 (29)	-.16 (29)	.57* (28)	.54* (26)	.03 (29)
Satisfaction with self						.07 (29)	.07 (28)	.02 (26)	.20 (29)
Desire to live in home community							-.06 (28)	.01 (26)	-.30 (29)
INTELLECTUAL									
Stanford Achiev. Test								.84** (26)	-.06 (28)
Stanford Binet IQ IQ									-.18 (26)
PERSONALITY									
MMPI-Pathology Index									

NOTE: Number in parentheses is the number of subjects for this coefficient.
*$p < .05$.
**$p < .01$.
†$p < .001$.

with two other sets of predictor variables--those relating to family background and to overall personality adjustment. Although they are consistent with the model of achievement presented earlier, these patterns of relationships can not be understood fully from these data alone. Subsequent analyses showing the relationship of these clusters to later achievement will offer important clues to their meaning.

A close examination of the predictor matrices for the four race and sex subgroups supports the patterns observed in the total predictor matrix. One observes at the outset, however, that

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TABLE 3.4: CORRELATION MATRIX OF PREDICTOR VARIABLES FOR BLACK MALES

PREDICTOR VARIABLES	FAMILY BACKGROUND			PERSONAL ATTITUDES			INTELLECTUAL		PERSONALITY
	Breadwinner's occup. level	Mother's education	Number of children in family of origin	Desired education	Satisfaction with self	Desire to live in home community	Stanford Achievement Test	Stanford-Binet IQ	MMPI-Pathology Index
FAMILY BACKGROUND									
Breadwinner's occup. level		.05 (23)	-.30 (28)	-.29 (28)	-.02 (28)	-.09 (28)	.45* (26)	-.59†† (20)	.06 (28)
Mother's education			-.29 (23)	.03 (23)	-.13 (23)	.13 (23)	-.19 (21)	.05 (15)	-.31 (23)
Number of children in family of origin				-.19 (28)	-.03 (28)	-.11 (28)	-.17 (26)	-.10 (20)	.42* (28)
PERSONAL ATTITUDES									
Desired education					.30 (28)	-.11 (28)	.74† (26)	.50* (20)	-.22 (28)
Satisfaction with self						.24 (28)	-.12 (26)	-.11 (20)	.08 (28)
Desire to live in home community							-.21 (26)	.07 (20)	-.08 (28)
INTELLECTUAL									
Stanford Achiev. Test								.70† (20)	-.38 (26)
Stanford-Binet IQ									-.57** (20)
PERSONALITY									
MMPI-Pathology Index									

NOTE: Number in parentheses is the number of subjects for this coefficient.
*$p < .05$.
**$p < .01$.
†$p < .001$.

there are fewer significant coefficients than are seen in the total matrix, a fact that seems to be the result of the much smaller number of subjects in the subgroup matrices. Of the 36 coefficients in each of the matrices, 4 are significant for the white males and females, 5 are significant for the black female group, and 7 are significant for the black males. In all four groups, almost all these significant coefficients are related to one or the other of the two ability measures, showing an overall configuration quite similar to that found in the combined correlation matrix. There are some small but interesting differences

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TABLE 3.5: CORRELATION MATRIX OF PREDICTOR VARIABLES FOR BLACK FEMALES

PREDICTOR VARIABLES	FAMILY BACKGROUND			PERSONAL ATTITUDES			INTELLECTUAL		PERSONALITY
	Breadwinner's occup. level	Mother's education	Number of children in family of origin	Desired education	Satisfaction with self	Desire to live in home community	Stanford Achievement Test	Stanford-Binet IQ	MMPI-Pathology Index
FAMILY BACKGROUND									
Breadwinner's occup. level		-.05 (36)	-.14 (38)	.17 (38)	-.05 (38)	-.06 (37)	.02 (31)	-.14 (27)	-.16 (37)
Mother's education			-.29 (39)	-.05 (39)	.16 (39)	-.04 (38)	.30 (32)	-.00 (27)	-.19 (38)
Number of children in family of origin				-.16 (43)	.04 (43)	-.18 (42)	-.38* (36)	-.32 (31)	.27 (42)
PERSONAL ATTITUDES									
Desired education					-.01 (43)	.14 (42)	.50** (36)	.25 (31)	-.10 (42)
Satisfaction with self						.07 (42)	.09 (36)	.13 (31)	-.26 (42)
Desire to live in home community							-.08 (36)	.27 (31)	-.06 (41)
INTELLECTUAL									
Stanford Achiev. Test								.53** (31)	-.49** (35)
Stanford-Binet IQ									-.44* (30)
PERSONALITY									
MMPI-Pathology Index									

NOTE: Number in parentheses is the number of subjects for this coefficient.
*p < .05.
**p < .01.
+p < .001.

in the strength of these coefficients, however, that merit a brief, albeit somewhat speculative, comment.

It appears that both ability measures are less strongly correlated with each other and, especially in the case of the Stanford-Binet, less strongly related to other variables for blacks than for whites. For example, the two academic ability measures are correlated .79 for white males, .84 for white females, .70 for black males, and .53 for black females. In addition, the Stanford Achievement and Stanford-Binet tests are correlated with desired education .72 and .72 for white males, .57

and .54 for white females, .74 and .50 for black males, and .50 and .25 for black females. None of these coefficients by themselves is especially striking, but together they do suggest that academic skill and performance on ability tests related to intelligence are more highly related to each other for whites than for blacks. Furthermore, for blacks personal attitude regarding how far one wanted to go in school is more highly correlated with achievement data than with intelligence measures. This differential correlation of academic achievement skills as opposed to measured intelligence or desired education does not occur for whites. In addition, males' desired education is more highly related to school achievement than for females. For white males, the measures of intelligence and academic skills are most highly correlated with each other *and* with desired education. For black females, the coefficients are the lowest of these four groups.

A speculative interpretation of this pattern is that cultural forces work to create a pattern in which performance in school and desire for education are more a function of the degree of intellectual ability for whites than for blacks and for males than for females. For both race and sex groups the traditional cultural stereotype would work in favor of lowering the educational expectancy and the desire for education for blacks and, to a lesser degree, for women; thus, one would expect to find lower correlations between both these variables and intelligence test scores. This expectation is borne out in our data.

The eighth-grade measures appear to be more highly related to each other than one would expect by chance, with variations clustering primarily around the ability dimensions of intelligence and academic achievement. Students who performed better on the two ability tests tended to come from families with fewer children and with higher socioeconomic status. They also tended to have lower psychopathology indices and to desire to go further in school. The existence of this cluster suggests that a powerful multidimensional factor influenced these measures.

AMONG FOLLOW-UP VARIABLES

Tables 3.6-3.10 present intercorrelations of the 13 follow-up variables. An inspection of the follow-up correlation coefficients for all subjects reveals that of the 78 coefficients in Table 3.6, 38 are significant beyond the .05 level and 25 of these 38 beyond the .01 level, well above what one would expect by chance. Although the pattern or clustering of significant coefficients in this matrix is not so apparent as the pattern found among the predictor variables, one of the achievement

variables--educational attainment--is significantly correlated with almost every other follow-up variable. The three achievement variables are all significantly related to each other, education, and occupational level* (-.40), with income and occupational level (-.54) being the most highly correlated. All measures of achievement are significantly correlated with many of the other follow-up variables selected for their potential role as moderators of achievement. Educational attainment, for example, was correlated with 8, occupational level with 6, and weekly income with 3 of the 10 moderator variables. Thus, while the achievement measures are significantly intercorrelated, they are not related to each other to such an extent that they failed to measure some unique factors as well. Correlations between the achievement measures and the moderator variables are of sufficient magnitude to suggest the moderator variables be seriously examined as secondary outcome measures in interpreting the patterns of relationships over time.

Many of the intercorrelations between the moderator variables are also significant, although in some cases they may have resulted from mathematical interdependence. The job change, change of residence, and rate of childbearing indices, for example, are predictable functions of variables measuring number of jobs, places lived, and number of children. Noteworthy among these intercorrelations is a cluster of significant coefficients among moderator variables dealing with migration and family circumstances and within those assessing family circumstances. These data suggest that subjects marrying earlier had children sooner after marriage and more closely spaced and were less likely to migrate to urban settings. Conversely, subjects not as likely to marry and become involved with family responsibilities as early were more likely to migrate, if only temporarily, to less-rural settings.

An inspection of follow-up correlation matrices for the four groups divided by race and sex (Tables 3.7, 3.8, 3.9, 3.10) suggests conclusions similar to those drawn from the inspection of the separate predictor matrices. First, fewer significant coefficients are observed in the separate matrices than in the overall matrix, although still more than would be expected by chance (8 for white males, 11 for white females, 22 for black males, and 15 for black females). Educational attainment, one of the achievement measures, and age at first marriage are highly correlated with each other for three of the four groups (.77 for white females, .63 for black males, and .71 for black females); they do not correlate as strongly with the other

*Recall that occupational level is scored such that low numbers indicate high status.

TABLE 3.6: CORRELATION MATRIX OF FOLLOW-UP VARIABLES FOR ALL SUBJECTS

	FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR									
		Education	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
ACHIEVEMENT	Education		-.40† (170)	.21* (136)	-.21** (168)	.28† (167)	-.13* (175)	.05 (164)	.29† (174)	-.22** (172)	.56† (117)	-.44† (130)	-.29† (116)	-.11 (173)
	Occupational level			-.54† (136)	.09 (164)	-.20* (163)	-.01 (170)	.03 (160)	-.22** (169)	.20** (167)	-.27** (115)	.25** (123)	.29† (114)	.09 (168)
	Weekly income				.00 (136)	.14 (135)	-.02 (136)	.01 (128)	.12 (135)	-.23** (134)	.24* (89)	-.18 (99)	-.21* (88)	-.07 (135)
MODERATOR	Number of jobs					.50† (167)	.10 (168)	.02 (158)	-.04 (167)	.01 (165)	-.09 (113)	.13 (125)	.17* (112)	-.16* (166)
	Job change index						-.02 (167)	.17* (157)	.15 (166)	-.04 (164)	.19* (113)	-.05 (125)	.01 (112)	-.15 (165)
	Number of places lived							.42† (164)	.06 (174)	.08 (172)	-.20* (117)	.10 (130)	.00 (116)	-.02 (173)
	Change of residence index								.12 (163)	-.02 (161)	.31† (111)	-.13 (124)	-.12 (110)	.06 (163)
	Farthest distance lived									-.29† (171)	.25** (117)	-.24** (130)	-.26** (116)	.01 (172)
	Urban/rural environment										-.28** (116)	.18* (129)	.20* (115)	-.01 (171)
	Age at first marriage											-.52† (116)	-.25** (116)	-.08 (116)
	Number of children												.90† (116)	.04 (129)
	Rate of childbearing													.06 (115)
	Health Opinion Survey													

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p \leq .05$.

**$p \leq .01$.

†$p \leq .001$.

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TABLE 3.7: CORRELATION MATRIX OF FOLLOW-UP VARIABLES FOR WHITE MALES

	FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR									
		Education	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
ACHIEVEMENT	Education		-.16 (44)	-.12 (42)	-.44* (44)	.20 (44)	-.08 (44)	.22 (41)	-.03 (43)	.05 (42)	.25 (29)	-.26 (29)	-.25 (29)	.04 (44)
	Occupational level			-.55** (42)	.02 (44)	-.24 (44)	-.19 (44)	-.14 (41)	-.05 (43)	.15 (42)	-.24 (29)	.12 (29)	.11 (29)	-.02 (44)
	Weekly income				.01 (42)	.07 (42)	.06 (42)	-.01 (39)	-.11 (41)	-.12 (40)	.04 (28)	.02 (28)	.01 (28)	.03 (42)
MODERATOR	Number of jobs					.44* (44)	.27 (44)	-.13 (41)	.12 (43)	.01 (42)	-.31 (29)	.32 (29)	.31 (29)	.00 (44)
	Job change index						.29 (44)	.45* (41)	.20 (43)	.00 (42)	.15 (29)	.07 (29)	.05 (29)	-.07 (44)
	Number of places lived							.39* (43)	-.19 (42)	.51** (41)	.09 (29)	-.16 (29)	-.19 (29)	.19 (44)
	Change of residence index								.35 (40)	-.21 (39)	.38 (28)	-.26 (28)	-.26 (28)	.04 (41)
	Farthest distance lived									-.12 (41)	.07 (29)	-.19 (29)	-.20 (29)	.08 (43)
	Urban/rural environment										-.26 (28)	-.14 (28)	.13 (28)	.12 (42)
	Age at first marriage											-.48* (29)	-.39 (29)	-.33 (29)
	Number of children												.98** (29)	-.11 (29)
	Rate of childbearing													.12 (29)
	Health Opinion Survey													

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.

**$p < .01$.

†$p < .001$.

TABLE 3.8: CORRELATION MATRIX OF FOLLOW-UP VARIABLES FOR WHITE FEMALES

FOLLOW-UP VARIABLES		ACHIEVEMENT			MODERATOR										
		Education	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
ACHIEVEMENT	Education		-.37 (42)	.28 (27)	.06 (43)	.29 (43)	.14 (44)	.13 (42)	.49** (44)	-.27 (43)	.77** (29)	-.55 (28)	-.31 (38)	-.22 (43)
	Occupational level			-.63** (27)	.11 (41)	-.10 (41)	-.13 (42)	-.10 (40)	-.28 (42)	.15 (41)	-.44* (37)	.35 (36)	.27 (36)	.23 (41)
	Weekly income				.00 (27)	-.02 (27)	.21 (27)	-.09 (26)	.37 (27)	-.35 (27)	.31 (23)	-.39 (22)	-.36 (22)	-.23 (27)
MODERATOR	Number of jobs					.49** (43)	.42* (43)	.13 (41)	-.12 (43)	.17 (42)	-.06 (38)	.06 (37)	.19 (37)	-.07 (42)
	Job change index						.27 (43)	.07 (47)	.15 (43)	.11 (42)	.13 (38)	.12 (37)	.20 (37)	-.15 (42)
	Number of places lived							.54** (42)	.15 (44)	.07 (43)	.01 (39)	.00 (38)	.02 (38)	.00 (43)
	Change of residence index								.16 (42)	.12 (41)	.44* (37)	-.13 (36)	-.04 (36)	.22 (41)
	Farthest distance lived									-.47* (43)	.37 (39)	-.38 (38)	-.29 (38)	-.09 (43)
	Urban/rural environment										-.27 (39)	.17 (38)	.09 (38)	.00 (43)
	Age at first marriage											-.46* (38)	-.16 (38)	-.14 (39)
	Number of children												.90** (38)	.16 (38)
	Rate of childbearing													.18 (38)
	Health Opinion Survey													

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.
**$p < .01$.
†$p < .001$.

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TABLE 3.9: CORRELATION MATRIX OF FOLLOW-UP VARIABLES FOR BLACK MALES

	FOLLOW-UP VARIABLES	Education	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
		ACHIEVEMENT			MODERATOR									
ACHIEVEMENT	Education		-.74† (36)	.69† (33)	-.32 (36)	.30 (35)	-.33* (37)	.14 (34)	.50** (37)	-.44** (37)	.63** (21)	-.54** (28)	-.41 (21)	-.06 (36)
	Occupational level			-.60† (33)	.30 (36)	-.29 (35)	.10 (36)	.29 (34)	-.44** (36)	.27 (36)	-.38 (21)	.64† (28)	.46 (21)	-.03 (35)
	Weekly income				-.40* (33)	.21 (32)	-.14 (33)	.23 (31)	.44** (33)	-.47 (33)	.27 (20)	-.05 (26)	-.26 (20)	.27 (32)
MODERATOR	Number of jobs					.51* (35)	-.13 (36)	-.18 (34)	-.23 (36)	.05 (36)	-.12 (21)	.27 (28)	.49* (21)	-.41* (35)
	Job change index						-.33* (35)	-.06 (33)	.24 (35)	-.18 (35)	.31 (21)	-.25 (28)	.02 (21)	-.14 (34)
	Number of places lived							.17 (34)	-.16 (37)	.31 (37)	-.50* (21)	-.08 (28)	-.26 (21)	-.10 (36)
	Change of residence index								-.07 (34)	-.23 (34)	.23 (19)	-.04 (26)	-.25 (19)	-.02 (34)
	Farthest distance lived									-.34* (37)	.32 (21)	-.74 (28)	-.35 (21)	.12 (36)
	Urban/rural environment										-.63** (21)	.28 (28)	.55** (21)	.03 (36)
	Age at first marriage											-.52* (21)	-.20 (21)	.29 (20)
	Number of children												.89† (21)	-.04 (27)
	Rate of childbearing													-.10 (20)
	Health Opinion Survey													

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.
**$p < .01$.
†$p < .001$.

TABLE 3.10: CORRELATION MATRIX OF FOLLOW-UP VARIABLES FOR BLACK FEMALES

FOLLOW-UP VARIABLES		ACHIEVEMENT			MODERATOR									
		Education	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Furthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
ACHIEVEMENT	Education		-.36* (48)	.43** (34)	-.03** (45)	.36* (45)	-.29* (50)	-.06 (47)	.31* (50)	-.22 (50)	.71† (28)	-.47** (35)	.33 (28)	-.16 (50)
	Occupational level			-.39* (34)	.09 (43)	-.14 (43)	.04 (48)	.08 (45)	-.18 (48)	.21 (48)	-.18 (28)	-.02 (35)	.25 (28)	.20 (48)
	Weekly income				-.03 (34)	.00 (34)	.12 (34)	.08 (32)	.11 (34)	-.34 (34)	.22 (18)	.01 (23)	-.02 (18)	-.17 (34)
MODERATOR	Number of jobs					.57† (45)	.08 (45)	.17 (42)	-.13 (45)	-.20 (45)	-.29 (25)	.21 (31)	.09 (25)	-.15 (45)
	Job change index						-.03 (45)	.20 (42)	.08 (45)	-.12 (45)	.05 (25)	.00 (31)	-.09 (25)	-.14 (45)
	Number of places lived							.48† (47)	-.01 (50)	.08 (50)	-.25 (28)	.29 (35)	.15 (28)	-.09 (50)
	Change of residence								-.03 (47)	.07 (47)	.26 (27)	-.14 (34)	-.02 (27)	.06 (47)
	Farthest distance lived									-.28* (50)	.33 (28)	-.13 (35)	-.11 (28)	.05 (50)
	Urban/rural environment										-.07 (28)	.35* (35)	.39* (28)	-.11 (50)
	Age at first marriage											-.55** (28)	-.12 (28)	.05 (28)
	Number of children												.86 (28)	-.10 (35)
	Rate of childbearing													.12 (29)
	Health Opinion Survey													

NOTE: The number in parentheses is the number in this coefficient.

*$p < .05$.
**$p < .01$.
†$p < .001$.

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variables as in the matrix for all subjects, however. The pattern of significant coefficients for black males is most similar to that of the overall matrix. In fact, some of the relationships are stronger for black males than for all subjects despite the much smaller numbers involved. Among the achievement measures, for instance, education for black males correlates -.74 with occupational level (versus -.40 for all subjects), and .69 with weekly income (versus .21 for all subjects). Education also correlates more strongly with two of the moderator variables dealing with family circumstances for black males, for example, .63 with age at first marriage (versus .56 for all subjects) and -.54 with number of children (versus -.44 for all subjects). The strength of these relationships suggests that education, or the lack of it, is an especially salient and predictive measure of achievement for black males, such that it may have a greater influence on the overall quality of their lives than for any of the other subgroups.

As is the case with the predictor variables, the 13 follow-up variables appear to contain a great deal of common variance related to traditional dimensions of achievement. The common dimensions underlying the predictor variables seem primarily related to performance on intellectual tests and to the size of family of origin, while the common dimensions underlying the follow-up variables seem related to the achievement measures reflecting educational and occupational success and also to a strong cluster of moderator variables reflecting delayed marriage and childbearing.

Dimensions underlying both the predictor and follow-up variables are related to each other. An ability measure reflecting performance on standardized intellectual tests is the most basic source of variability in the eighth-grade data and educational attainment--a measure associated with persistence as well as ability--was a variable of special importance in the follow-up data. Similarly, variables reflecting opportunity, such as growing up in a smaller family, marrying relatively later, and having fewer children as a young adult, are likely to be related to each other as well. The crucial test for this view of the kinds of dimensions underlying achievement at the two periods of the subjects' lives comes in the correlations between predictor and follow-up variables over time.

CORRELATIONS BETWEEN PREDICTOR AND FOLLOW-UP VARIABLES

Correlations between the eighth-grade predictor variables and the follow-up variables 10 years later are presented in Tables 3.11-3.15. The high degree of intercorrelation among the

variables at both times will need to be kept in mind when interpreting the correlation coefficients over the 10-year period.

An initial inspection of Table 3.11, containing the correlation coefficients for all subjects, reveals that 23 of the 117 total coefficients were significant beyond the .05 level, with 13 of these significant beyond the .01 level. Both figures are well above chance expectancy. Thus, it appears that there is some degree of relationship between predictor and follow-up data for a group of subjects over a 10-year interval.*

The data in Table 3.11 indicate that the variables measuring ability--the Stanford Achievement and the Stanford-Binet instruments--are the best predictors of all measures of achievement. These ability tests are most strongly correlated with educational attainment (.44 and .43) but are also significantly correlated with occupational level (-.29 and -.30). Only the Stanford-Binet IQ scores are significantly correlated with weekly income (.35), however. Thus, fundamental intellectual ability and commensurate academic skill level are psychological attributes most related to subsequent educational and occupational achievement. They account for only a portion of the variance in educational achievement, however. The cross-time comparisons indicate that variables representing desire and opportunity contribute to the prediction of achievement as well. A subject's stated desire for education, in fact, is more highly correlated with educational attainment (.51) than is either of the ability measures (.44 and .43). Number of children in the family of origin is also associated with education (-.33), although to a smaller extent. The other variables are not associated with economic achievement. Subjects reporting more desired education and coming from smaller families are also more likely to go further in school.

To what extent do the additional classes of variables predict educational and economic achievement above and beyond that explainable from measures of ability alone? That is, How much unique predictive variance is added to measures of ability by measures reflecting desire and opportunity? The stepwise regression analyses reported in the next section indicate the extent of this additional variance for both the educational and economic indices of achievement.

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*A canonical correlation coefficient between the 9 predictor and 13 follow-up variables was .84, indicating a strong amount of overall similarity between the variables collected at two widely separated points in time on the same subjects.

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TABLE 3.11: CORRELATIONS BETWEEN PREDICTOR AND FOLLOW-UP VARIABLES FOR ALL SUBJECTS

PREDICTOR VARIABLES \ FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR									
	Educational attainment	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
FAMILY BACKGROUND													
Breadwinner's occup. level	.02 (81)	.01 (78)	-.04 (64)	.18 (78)	-.03 (77)	-.10 (81)	.07 (77)	.17 (81)	-.02 (80)	.24 (56)	-.08 (59)	-.04 (55)	.09 (80)
Mother's education	.12 (78)	-.12 (74)	-.14 (60)	.01 (75)	-.01 (74)	.19 (78)	.09 (75)	-.09 (78)	-.06 (77)	-.07 (52)	-.11 (55)	-.14 (51)	-.14 (78)
Number of children in family of origin	-.33** (85)	.16 (81)	-.14 (66)	-.05 (81)	-.10 (80)	.09 (85)	-.12 (80)	-.21 (85)	.23 (84)	-.09 (56)	.35** (60)	.45† (55)	.07 (84)
PERSONAL ATTITUDES													
Desired education	.51† (85)	-.18 (81)	-.09 (66)	-.17 (81)	.09 (80)	-.03 (85)	-.06 (80)	.21* (85)	-.05 (84)	.10 (56)	-.27* (60)	-.31** (55)	-.13 (84)
Satisfaction with self	.02 (85)	.15 (81)	.04 (66)	-.05 (81)	.03 (80)	-.17 (85)	-.08 (80)	-.09 (85)	.05 (84)	.13 (56)	-.03 (60)	-.01 (55)	.02 (84)
Desire to live in home community	-.19* (84)	-.06 (80)	.05 (65)	.13 (80)	.03 (79)	-.03 (84)	.03 (79)	-.14 (84)	.00 (83)	-.11 (56)	.11 (59)	.13 (55)	-.07 (83)
INTELLECTUAL													
Stanford Achievement Test	.44† (78)	-.29** (74)	.13 (60)	-.01 (74)	.31** (74)	.03 (78)	-.04 (73)	.20 (78)	-.04 (77)	.00 (54)	-.28* (57)	-.35** (53)	-.26* (77)
Stanford-Binet IQ	.43† (69)	-.30* (66)	.35** (53)	.00 (65)	.36** (65)	.11 (69)	.10 (64)	.19 (69)	-.07 (68)	.16 (48)	-.33* (51)	-.29* (48)	-.12 (68)
PERSONALITY													
MMPI Pathology index	-.16 (174)	.10 (169)	.00 (136)	.25† (167)	.21* (166)	-.01 (174)	-.05 (163)	-.16* (173)	.02 (171)	-.02 (116)	.07 (129)	.00 (115)	-.04 (172)

Note: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.

**$p < .01$.

†$p < .001$.

Before presenting those analyses, relationships between the moderator and predictor variables over time are noted. Given that some of the moderator variables are strongly associated with the achievement variables, it is of particular interest that the two moderator variables dealing with family circumstances--number of children and rate of childbearing--are those most strongly related to the predictor variables. Both family variables are significantly correlated in a negative direction with the two ability predictors and the measure of educational desire. They are also positively correlated with the opportunity measure, number of children in the family of origin. There is an absence of significant relationships between other moderator variables. Measures of job change, of migration, and of personality adjustment are not related to achievement at follow-up or to eighth-grade variables significantly predicting achievement over time. Thus, the role of the measures of family circumstances as an important outcome measure strongly related to achievement is strengthened by these correlations over time. So striking is the power of this cluster of outcome measures that future studies should include such measures among their primary achievement indices.

The cross-time correlations for the separate sex and race groups (Tables 3.12 through 3.15) are also of interest, though they present several problems. First, the number of subjects for whom both predictor and follow-up data were available is quite small for many of the analyses. For example, the correlations between MMPI Pathology Index scores and other followup variables have an acceptable number of subjects (N=44 for most coefficients). For other variables, however, the typical numbers of white males (17), of white females (19), and of black males (17) are smaller than those of black females, which is about 30. Because of the joint effects of the incomplete eighth-grade data and the 33% attrition over time until follow-up, the numbers of subjects in each race and sex group are simply too small to be studied confidently. Another reason the N's are small and variable from cell to cell is that every variable is not equally applicable to every subject. Not all subjects were married, had children, or were employed. Thus, many of the correlation coefficients in those tables are based on such small numbers of subjects that extensive interpretation of them would be potentially misleading.

The grouped tables do contain several significant coefficients, although fewer than are typically found for the grouped within-time matrices. For example, only 5 of the 117 (4.2%) coefficients in the data for white males were significant beyond the .05 level. This small number of coefficients is not larger than one would expect by chance alone and, therefore, any

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TABLE 3.12: CORRELATIONS BETWEEN PREDICTOR AND FOLLOW-UP VARIABLES FOR WHITE MALES

PREDICTOR VARIABLES \ FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR								
	Educational attainment	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
FAMILY BACKGROUND													
Breadwinner's occup. level	-.64* (17)	.20 (17)	-.27 (17)	.55* (17)	.43 (17)	.05 (17)	-.09 (16)	.01 (17)	-.02 (16)	-.16 (12)	.61* (12)	.54 (12)	-.14 (17)
Mother's education	.16 (15)	-.21 (15)	-.22 (15)	-.13 (15)	.28 (15)	.08 (15)	.27 (14)	-.06 (15)	.33 (14)	.35 (10)	-.14 (10)	-.29 (10)	-.12 (15)
Number of children in family of origin	-.42 (17)	.16 (17)	-.04 (17)	-.11 (17)	-.40 (17)	-.39 (17)	-.24 (16)	-.23 (17)	-.11 (16)	.16 (12)	.12 (12)	.30 (12)	.01 (17)
PERSONAL ATTITUDES													
Desired education	.58* (17)	.20 (17)	-.03 (17)	-.18 (17)	.24 (17)	-.01 (17)	-.06 (16)	.18 (17)	.11 (16)	.07 (12)	-.22 (12)	-.31 (12)	.05 (17)
Satisfaction with self	.00 (17)	.00 (17)	.13 (17)	.07 (17)	.28 (17)	.13 (17)	.16 (16)	-.27 (17)	.48 (16)	.52 (12)	-.20 (12)	-.01 (12)	-.16 (17)
Desire to live in home community	-.26 (17)	-.29 (17)	.07 (17)	.19 (17)	.16 (17)	.34 (17)	.25 (16)	.43 (17)	-.39 (16)	.29 (12)	.00 (12)	-.07 (12)	-.07 (17)
INTELLECTUAL													
Stanford Achievement Test	.46 (15)	.11 (15)	.08 (15)	.10 (15)	.26 (15)	.09 (15)	.02 (14)	.12 (15)	-.08 (14)	-.25 (11)	.01 (11)	-.08 (11)	.00 (15)
Stanford-Binet IQ	.66** (15)	-.30 (15)	.34 (15)	-.18 (15)	.20 (15)	.24 (15)	.26 (14)	.10 (15)	.08 (14)	.11 (11)	-.50 (11)	-.52 (11)	.06 (15)
PERSONALITY													
MMPI Pathology Index	-.05 (44)	-.20 (44)	.04 (42)	.24 (44)	.12 (44)	-.01 (44)	-.11 (44)	-.01 (43)	-.23 (42)	-.31 (29)	.30 (31)	.20 (29)	-.03 (44)

NOTE: The number in parentheses is the number in this coefficient.

*$p < .05$.

**$p < .01$.

†$p < .001$.

TABLE 3.13: CORRELATIONS BETWEEN PREDICTOR AND FOLLOW-UP VARIABLES FOR WHITE FEMALES

PREDICTOR VARIABLES \ FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR									
	Educational attainment	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
FAMILY BACKGROUND													
Breadwinner's occup. level	.23 (19)	-.37 (18)	-.01 (13)	-.22 (19)	-.21 (19)	-.05 (19)	.33 (19)	.10 (19)	-.16 (19)	.54* (16)	-.40 (15)	.30 (15)	.40 (19)
Mother's education	.54* (19)	-.13 (18)	-.10 (13)	.18 (19)	.00 (19)	.36 (19)	-.21 (19)	-.09 (19)	-.13 (19)	.18 (16)	-.06 (15)	.13 (15)	-.14 (19)
Number of children in family of origin	-.65** (19)	.15 (14)	-.27 (13)	-.17 (19)	.20 (19)	-.24 (19)	-.22 (19)	-.31 (19)	.41 (19)	-.50* (16)	.53* (15)	.12 (15)	-.04 (19)
PERSONAL ATTITUDES													
Desired education	.55* (19)	-.12 (18)	-.08 (13)	.32 (19)	.32 (19)	.13 (19)	-.22 (19)	.31 (19)	.06 (19)	.33 (16)	-.37 (15)	-.23 (15)	-.45 (19)
Satisfaction with self	-.07 (19)	.46 (18)	-.11 (13)	.29 (19)	.01 (19)	-.63** (19)	-.06 (19)	-.10 (19)	.31 (19)	-.04 (16)	-.29 (15)	-.34 (15)	.10 (19)
Desire to live in home community	-.30 (19)	-.10 (18)	-.38 (13)	.06 (19)	.05 (19)	-.12 (19)	-.32 (19)	-.38 (19)	.58** (19)	-.19 (16)	.30 (15)	.24 (15)	-.06 (19)
INTELLECTUAL													
Stanford Achievement Test	.36 (19)	-.15 (18)	.15 (13)	.16 (19)	.52* (19)	.02 (19)	-.26 (19)	-.06 (19)	.22 (19)	.02 (16)	-.16 (15)	-.59* (15)	-.67** (19)
Stanford-Binet IQ	.48* (17)	-.29 (16)	.04 (12)	.16 (17)	.65** (17)	.51* (17)	.19 (17)	.41 (17)	-.13 (17)	.35 (14)	-.16 (15)	-.15 (14)	-.20 (17)
PERSONALITY													
MMPI Pathology Index	.10 (44)	.17 (42)	-.02 (27)	.32* (43)	.44* (43)	-.01 (44)	-.10 (42)	-.07 (44)	-.08 (43)	-.11 (39)	.15 (38)	.14 (38)	.01 (43)

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.

**$p < .01$.

†$p < .001$.

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TABLE 3.14: CORRELATIONS BETWEEN PREDICTOR AND FOLLOW-UP VARIABLES FOR BLACK MALES

PREDICTOR VARIABLES \ FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR								
	Educational attainment	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
FAMILY BACKGROUND													
Breadwinner's occup. level	-.13 (18)	.10 (17)	-.04 (17)	.25 (17)	.10 (16)	.09 (18)	.03 (15)	.37 (18)	-.04 (18)	.11 (10)	-.01 (12)	-.10 (10)	-.05 (17)
Mother's education	-.49 (15)	-.02 (14)	-.21 (14)	.28 (14)	-.07 (13)	.04 (15)	-.06 (13)	-.44 (15)	-.18 (15)	-.67 (8)	-.02 (10)	-.05 (8)	-.37 (15)
Number of children in family of origin	-.02 (18)	-.03 (17)	.03 (17)	.14 (17)	.20 (16)	.00 (18)	.22 (15)	-.34 (18)	.27 (18)	.27 (10)	.17 (12)	.68* (10)	.32 (17)
PERSONAL ATTITUDES													
Desired education	.44 (18)	-.57* (17)	.13 (17)	-.25 (17)	.08 (16)	.42 (18)	-.18 (15)	.23 (18)	-.19 (18)	.20 (10)	-.47 (12)	-.39 (10)	.05 (17)
Satisfaction with self	.06 (18)	.08 (17)	.35 (17)	-.12 (17)	.11 (16)	-.08 (18)	.35 (15)	-.10 (18)	-.38 (18)	.35 (10)	.27 (12)	.16 (10)	-.03 (17)
Desire to live in home community	-.54** (18)	.26 (17)	-.07 (17)	.05 (17)	-.44* (16)	-.07 (18)	-.14 (15)	-.27 (18)	.23 (18)	-.45 (10)	.74** (12)	.56* (10)	-.35 (17)
INTELLECTUAL													
Stanford Achievement Test	.60** (17)	-.59* (16)	.02 (16)	-.41 (16)	.05 (16)	-.15 (17)	-.45 (14)	.43 (17)	.09 (17)	.21 (10)	-.55 (12)	-.41 (10)	.11 (16)
Stanford-Binet IQ	.32 (13)	-.43 (12)	.33 (12)	-.54 (12)	-.16 (12)	.14 (13)	-.19 (10)	.06 (13)	.18 (13)	-.48 (8)	-.28 (9)	-.32 (8)	-.24 (12)
PERSONALITY													
MMPI Pathology Index	-.38* (37)	.26 (36)	-.25 (33)	.25 (36)	.10 (35)	.10 (37)	-.24 (34)	-.05 (37)	.06 (37)	-.09 (21)	.09 (28)	.02 (21)	.24 (36)

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.

**$p < .01$.

†$p < .001$.

TABLE 3.15: CORRELATIONS BETWEEN PREDICTOR AND FOLLOW-UP VARIABLES FOR BLACK FEMALES

PREDICTOR VARIABLES \ FOLLOW-UP VARIABLES	ACHIEVEMENT			MODERATOR								
	Educational attainment	Occupational level	Weekly income	Number of jobs	Job change index	Number of places lived	Change of residence index	Farthest distance lived	Urban/rural environment	Age at first marriage	Number of children	Rate of childbearing	Health Opinion Survey
FAMILY BACKGROUND													
Breadwinner's occup. level	.15 (31)	.13 (26)	.07 (17)	-.19 (25)	-.29 (25)	-.31 (27)	.10 (27)	.17 (27)	.16 (27)	.25 (18)	-.25 (20)	-.16 (18)	.07 (27)
Mother's education	.10 (29)	.00 (27)	.06 (18)	-.17 (27)	-.14 (27)	.46** (29)	.16 (29)	.02 (29)	-.11 (29)	.10 (18)	-.20 (20)	-.19 (18)	.02 (29)
Number of children in family of origin	-.38* (31)	.07 (29)	-.25 (19)	.04 (28)	-.13 (28)	.24 (31)	-.19 (30)	.06 (31)	.20 (31)	-.41 (18)	.50* (21)	.04 (18)	-.05 (31)
PERSONAL ATTITUDES													
Desired education	.50** (31)	-.20 (29)	.16 (19)	-.07 (28)	.06 (28)	-.34 (31)	.04 (30)	.18 (31)	-.11 (31)	.04 (18)	-.34 (21)	-.50* (18)	-.12 (31)
Satisfaction with self	.00 (31)	.07 (29)	.05 (19)	-.06 (28)	.03 (28)	-.22 (31)	-.31 (30)	.05 (31)	-.21 (31)	-.02 (18)	.05 (21)	.21 (18)	-.01 (31)
Desire to live in home community	.13 (30)	.10 (28)	.25 (18)	.09 (27)	.15 (27)	.04 (30)	.06 (29)	-.23 (30)	-.21 (30)	.19 (18)	-.11 (20)	-.02 (18)	.10 (30)
INTELLECTUAL													
Stanford Achievement Test	.50** (27)	.35 (25)	.37 (16)	.05 (24)	.35 (24)	.21 (27)	.22 (26)	.15 (27)	-.07 (27)	.16 (17)	-.30 (19)	-.21 (17)	-.27 (27)
Stanford-Binet IQ	.60** (24)	-.07 (23)	.44 (14)	-.04 (21)	.36 (21)	.07 (24)	.09 (23)	.09 (24)	-.07 (24)	.17 (24)	-.13 (17)	.22 (15)	-.10 (24)
PERSONALITY													
MMPI Pathology Index	-.27 (49)	.04 (47)	-.28 (34)	.28 (44)	.06 (44)	-.03 (49)	.13 (46)	-.29* (49)	.16 (49)	-.48** (27)	.07 (34)	-.45* (27)	-.22 (49)

NOTE: The number in parentheses is the number of subjects in this coefficient.

*$p < .05$.

**$p < .01$.

†$p < .001$.

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interpretation of them would be inappropriate. The table for white females yielded the highest number of significant correlations of the groups, with 16 or 13.7% of the coefficients reaching the .05 level. The pattern of these significant coefficients is quite similar to that for all the subjects, with the two intellectual measures being the strongest predictors of educational achievement. Many of these coefficients for the white females are greater than for all subjects. For example, educational attainment correlated -.65 with the number of children in the family of origin for white females (versus -.33 for all subjects), .55 with desired education (versus .51 for all subjects), and .48 with the Stanford-Binet intelligence score (versus .43 for the total group). The tables for both black males and females had more significant coefficients than for the white males (9, or 7.7% for the black males, and 10, or 8.5%, for the black females). Given that standardized intellectual measures are shown to be biased against blacks in many instances, among the most interesting findings for both groups of black subjects is the fact that educational attainment is strongly correlated with Stanford Achievement Test and Stanford-Binet intelligence scores (.60 and .32 for black males and .50 and .60 for black females). This finding is intriguing, but since we are dealing with such small numbers, caution is exercised in interpreting it.

REGRESSION ANALYSES

Four stepwise regression analyses are computed to further clarify the quantitative predictors of achievement. Each of the achievement variables is taken separately as a criterion against which weighted combinations of predictor variables are mathematically constructed so as to maximize the ability of the weighted formulas to predict the follow-up variable. Given the emergence of the family circumstances variables as another reasonable outcome criterion, a regression analysis is also computed on rate of childbearing.

The stepwise procedure used began with the strongest single correlation between a single predictor variable and the follow-up variable in question. Then it mathematically partialled out the variance due to that one strong predictor variable and then selected the strongest of the remaining eight predictor variables. Unique variance of the second variable alone was then partialled out and the remaining variables examined again. This procedure failed to show unique variance after a few (typically 3 to 5) variables had been selected and removed. However, such a procedure is limited since it maximizes the chance variation of the particular data set available; a cross-validation on more

than one group of subjects is necessary before strong conclusions can be made about the relative ability of one set of variables to predict other variables.

In spite of the limitations of regression analysis, it is used to demonstrate how much unique variance was accounted for by various predictor variables. The apparent strong cluster of common relationships in the correlation matrices suggests the importance of examining the relative ability of the predictor variables to uniquely predict each of the achievement variables.

Table 3.16 presents stepwise regression analyses for educational attainment, occupational level, weekly income, and rate of childbearing. The columns in the table represent four separate regression formulas and analyses. Only those elements in the equation that accounted for at least 1% of unique variance in the follow-up variable in question are included. Thus, only 4 or 5 of the 9 predictor variables are included in any of the 4 prediction equations. For each regression analysis the numbers beside the predictor variables represent the cumulative multiple correlation coefficient (R) or the correlation coefficient between the follow-up variable and the combination of the predictor variables constructed at that step of the analysis. The second number represents the cumulative percentage of variance in the follow-up variable accounted for (the R^2), and the third indicates the step at which that variable's unique variance is added to the regression formula.

It can be seen that this regression analysis supports the impressions gathered from the correlation matrices. Educational attainment and rate of childbearing are the most easily predicted achievement indices. The final multiple-correlation coefficient for educational attainment is .56, accounting for 31% of the variance in the amount of education the subjects received. The Stanford Achievement Test and the subject's desired education are the first two variables selected in this equation, with the Stanford-Binet Intelligence Scale and the breadwinner's occupation scale being the last two variables selected before less than 1% of unique variance is added with each successive step. Thus, measures reflecting ability (intellectual test performance), desire (desired education), and opportunity (parents' occupational level) constituted the best combination of unique variance in predicting educational attainment.

The regression equation predicting the rate of childbearing has the number of children in the family of origin as its first and largest step, mother's education as the second, breadwinner's occupational level scale as the third, subject's satisfaction with self as the fourth, and the Stanford-Binet

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TABLE 3.16: STEPWISE REGRESSION EQUATIONS BETWEEN ALL PREDICTOR VARIABLES AND SELECTED FOLLOW-UP VARIABLES

Predictor Variables \ Follow-up Variables		Education (*N*=60)	Occupation level (*N*=57)	Weekly income (*N*=46)	Rate of childbearing (*N*=43)
Number of children in family of origin	R			.49	.46
	R^2			23%	22%
	*Step			(4)	(1)
Breadwinner's occupational level	R	.56			.53
	R^2	31%			28%
	Step	(4)			(3)
Mother's education	R			.43	.52
	R^2			19%	27%
	Step			(2)	(2)
Desired education	R	.54	.41	.46	
	R^2	29%	17%	21%	
	Step	(2)	(3)	(3)	
Satisfaction with self	R		.39		.54
	R^2		15%		30%
	Step		(2)		(4)
Desire to live in home community	R				
	R^2				
	Step				
Stanford-Binet IQ	R	.55		.36	.56
	R^2	30%		13%	31%
	Step	(3)		(1)	(5)
Stanford Achievement Test	R	.45	.37		
	R^2	21%	13%		
	Step	(1)	(1)		
MMPI Personality Inventory	R		.42		
	R^2		18%		
	Step		(4)		

Note: Only those elements in the equation that accounted for at least one percent of unique variance in the follow-up variable are included. For each regression analysis the numbers beside the predictor variables represent the cumulative correlation coefficient (R) or the correlation coefficient between the follow-up variable and the combination of the predictor variables constructed at that step of the analysis.

**Step at which this variance was added.*

Intelligence score as the fifth step. The overall *R* for this outcome measure is as large as that obtained for education (.56). Thus, measures reflecting opportunity are stronger predictors of this fertility index, with ability entering near the end of the equation.

The two employment-related achievement variables, occupational level and weekly income, are predicted with similar success. The largest multiple coefficients are .42 for occupational level and .49 for weekly income. In predicting occupational level, an ability variable (Stanford Achievement Test) and one reflecting desire (desired education) are entered on the first and third steps, with the subject's self-satisfaction and his MMPI Psychopathology Index scores entered on the second and fourth steps. A different pattern of predictor variables is selected to predict the subjects' weekly incomes. The Stanford-Binet intelligence scores are selected first in this equation followed by mother's education, desired education, and number of children in the family of origin. Thus, only a subject's desired education is common to the prediction equations of both these employment-related variables. Other kinds of prediction measures are less consistent and clear-cut.

These regression analyses, as a whole, indicate that one can indeed predict achievement measures taken at young adulthood from measures gathered during the eighth grade. Although one must interpret the details of these analyses with caution, they are entirely consistent with conclusions drawn from the previous correlational analyses in which intellectual ability variables are positively associated with educational attainment and employment success.

Although the degree of achievement at young adulthood is surely not immune to subsequent change, it appears to be stable enough to be predicted from data gathered ten years beforehand. At this point in our subjects' lives their educational achievement appears to be the measure of achievement most consistent with measures collected on them years before. Education is the most easily predicted of the achievement variables; it is related to measures of ability, desire, and opportunity. Because this stage of their lives was one characterized by a shift from formal schooling to occupational challenges as the primary arena for achievement motivation, this finding is not surprising. A subsequent followup when our subjects are in their mid-30s may find that occupational and economic achievement are more easily predicted than they were when these data were collected. At the time of this study, however, the primary conclusion about achievement is that it appears to be most strongly related to measures of general intelligence and academic skills for both blacks and whites. The multifactor model (ability, desire, persistence, and opportunity) proposed for achievement is generally supported for educational achievement and, when the subjects have had more time in the marketplace, it may eventually be supported for economic variables as well. Of particular note in

the data reported thus far is the strong relationship between fertility variables and the other kinds of achievement. For whatever reasons, delaying childbearing was for our subjects as strongly associated with achievement as measures of ability, desire, and opportunity.

Chapter 4

TESTS OF MEAN DIFFERENCES

The central focus of this chapter is on educational attainment, the most powerful measure found in the correlational analyses, and on several important moderator and predictor variables, including the MMPI Psychopathology Index predictor, follow-up data reflecting marital status, and a cluster of migration variables (farthest distance from home, type of moving pattern, and urban/rural environment).

Educational attainment is studied here because of its superiority as a measure of achievement for our subjects at this point in their lives. Education was predicted more successfully than either of the employment-related achievement measures and seemed an especially critical precursor to other kinds of achievement for black subjects.

Conversely, the MMPI Psychopathology Index was chosen for further study primarily because of the *lack* of substantive findings relating it to achievement. Personality adjustment was expected to influence achievement by affecting subjects' persistence, or motivation to apply their abilities to the opportunities available to them. Poorer adjustment was expected to be associated with underachievement, but neither the MMPI Psychopathology Index nor Health Opinion Scale (HOS) scores were found to be related to achievement. Since previous findings (Gilmore, 1974; McClelland, *et al.*, 1976; Purkey, 1970) linked personality adjustment to achievement, an additional attempt was made to identify any such relationships in the data we had assembled. We chose to study the MMPI rather than the HOS data because of the wider range of scores shown on the former. Many of our subjects, as Baughman and Dahlstrom noted, showed disturbed MMPI profiles. Very few subjects, however, deviated from typical scores on the HOS. Thus, the earlier and more ominous personality adjustment data were chosen for further analysis.

Marital status is included, in part, because its categorical nature precluded its inclusion in the correlational analyses reported in Chapter 3. In addition, the emergence of fertility

as a powerful factor associated with traditional measures of achievement argued for a more detailed study of how marital and family status influence achievement among these subjects.

Migration is used because of the weak positive relationship shown between it and achievement (see Chapter 3). Previous research (Shaw, 1975) has shown a strong positive association between migration and achievement. Persons with *greater* ability, desire, and persistence have been those thought to be more likely to leave the rural South in search of greater opportunities. Therefore, the three migration variables are examined to investigate further the weakly supported conclusion that migration is related to achievement.

The subjects are divided into two groups--a high-scoring and a low-scoring group for each of the six variables. High- and low-scoring groups on educational attainment, for example, are then compared on all other predictor and follow-up variables to identify any significant mean differences. Thus, we report *t* tests for six sets of analyses resulting from this partitioning of subjects. Caution is exercised in reporting these multiple *t* tests because a certain number of significant differences are expected from chance alone.

THE SPECIFIC VARIABLES STUDIED

Educational attainment, the first variable examined, is divided into two types of subjects--those completing *high school or less* and those completing some type of *post-secondary schooling*. Marital status subgroups are constructed by dividing subjects into those who had never married (*single subjects*) and those who had *married at least once* (those now married, divorced, separated, or remarried). Subgroups based on subjects' eighth-grade MMPI Psychopathology Index constituted a *high psychopathology* category of subjects scoring 550 or above (Cooke's cutting score for a pathological profile) and a *low psychopathology* subgroup (those scoring below 550).

The migration variables include those always *living within North Carolina* and those who lived for some period of time *outside of the state*. A further division was made of those living in an *urban or small town environment* and those living in a *rural area or on a farm*. Using follow-up data not reported thus far, subjects are also divided into those who *had never left home* (their parents' domicile) and those who *had left home* for any of a variety of reasons (for example, to get married, to find a job, or to set up housekeeping on their own). If subjects had lived away from home for a limited period of time

(such as college or military service) and had returned home, they were classed as having never left home.

TESTS OF MEAN DIFFERENCES BETWEEN GROUPS

HIGH- AND LOW-EDUCATIONAL ATTAINMENT

Table 4.1 contains the means, standard deviations, and t tests comparing those subjects with educational attainments of high school graduation or less with those having some additional schooling. Individual t tests are computed for all 9 predictors and for the 12 follow-up variables. Two-tailed probabilities are presented for each test.

An inspection of Table 4.1 reveals that 12 of the 21 t tests are significant beyond the .05 level and 8 are significant beyond the .01 level. This number of significant tests exceeds that expected by chance. Thus, the two groups differing on educational attainment appear to be significantly different on many other variables as well. For example, on the predictor variables, those with at least some post-high school education are from smaller families ($p < .02$), desired more education when they were in the eighth grade ($p < .001$), had less desire to live in Millfield when grown ($p < .05$), and had significantly higher Stanford Achievement Test ($p < .001$) and Stanford-Binet Intelligence Test ($p < .001$) scores. These two groups of subjects are also significantly different on a number of the follow-up variables. For example, subjects with more formal education worked at jobs of higher status ($p < .001$), changed jobs more frequently ($p < .001$), had lived farther from home ($p < .001$) and in a more urban environment ($p < .01$), married later ($p < .001$), and had fewer children ($p < .001$) at a slower rate ($p < .02$). These differences between low- and high-education groups are consistent among themselves and consistent with the kinds of patterns found to be associated with education in the correlational analyses.

SINGLE AND MARRIED SUBJECTS

Table 4.2 presents the means, standard deviations, and t-test data comparing those subjects who were still single at the time of followup and those who had been married at least once. Of the 170 subjects located, 51 (or 30%) were still single, but the majority had married. More whites than blacks were married (76% versus 61%), and more females than males (74% versus 62%) were married, although these differences are not considered to be large enough to seriously influence analyses involving all

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TABLE 4.1: TESTS OF SIGNIFICANCE BETWEEN GROUPS WITH HIGH AND LOW EDUCATIONAL ATTAINMENT FOR PREDICTOR AND FOLLOW-UP VARIABLES

PREDICTOR VARIABLES	EDUCATIONAL ATTAINMENT: Low Mean	Low S.D.	High Mean	High S.D.	df	t	two-tailed p
FAMILY BACKGROUND							
Breadwinner's occup. level	3.22	1.13	3.13	1.23	79	.34	.74
Mother's education	9.41	2.30	10.09	2.61	76	-1.22	.23
Number of children in family of origin	6.30	3.58	4.62	3.19	83	2.20	.02
PERSONAL ATTITUDES							
Desired education	2.60	1.12	3.62	.83	83	-4.13	.001
Satisfaction with self	3.21	.77	3.31	.64	83	-.65	.52
Desire to live in home community	2.87	1.66	2.16	1.40	82	2.03	.05
INTELLECTUAL							
Stanford Achiev. Test	124.43	19.60	144.83	20.90	76	-4.32	.001
Stanford-Binet IQ	86.78	15.28	100.25	12.00	67	-3.60	.001
PERSONALITY ADJUSTMENT							
MMPI Pathology Index	539.51	106.60	525.92	84.47	172	.90	.37

FOLLOW-UP VARIABLES	Low Mean	Low S.D.	High Mean	High S.D.	df	t	two-tailed p
ACHIEVEMENT							
Occupational level	3.47	.78	2.97	.98	168	3.68	.001
Weekly income	2.79	1.09	3.11	1.03	134	-1.78	.07
MODERATOR							
Number of jobs	2.67	1.53	2.41	1.52	166	1.10	.27
Job change index	.65	.40	.90	.46	165	-3.60	.001
Number of places lived	2.31	1.72	1.95	1.20	173	1.57	.12
Change of residence index	.66	.84	.65	.56	162	.07	.94
Farthest distance lived	1.20	.65	1.62	1.05	172	-3.24	.001
Urban/rural environment	3.01	1.03	2.48	1.17	170	3.15	.01
Age at first marriage	18.44	1.09	20.20	1.67	115	-5.12	.001
Number of children	1.20	1.01	.60	.67	128	3.71	.001
Rate of childbearing	.19	.14	.12	.13	114	2.29	.02
Health Opinion Score	26.05	4.56	25.37	4.23	171	1.00	.32

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TABLE 4.2: TESTS OF SIGNIFICANCE BETWEEN SINGLE AND MARRIED SUBJECTS FOR PREDICTOR AND FOLLOW-UP VARIABLES

PREDICTOR VARIABLES	Single Ss Mean	Single Ss S.D.	Married Ss Mean	Married Ss S.D.	*df*	*t*	two-tailed *p*
FAMILY BACKGROUND							
Breadwinner's occup. level	3.13	1.29	3.23	1.12	78	-.34	.74
Mother's education	10.60	2.70	9.40	2.20	75	2.10	.04
Number of children in family of origin	6.20	4.10	5.40	3.20	82	.99	.33
PERSONAL ATTITUDES							
Desired education	3.11	1.11	2.98	1.13	82	.50	.62
Satisfaction with self	3.15	.67	3.29	.75	82	-.81	.42
Desire to live in home community	2.19	1.50	2.81	1.60	81	-1.66	.10
INTELLECTUAL							
Stanford Achiev.	129.70	25.80	132.10	21.10	75	-.54	.59
Stanford-Binet IQ	90.20	15.80	91.90	2.30	66	-.39	.70
PERSONALITY							
MMPI Pathology index	554.60	84.30	525.70	101.3	169	1.77	.08

FOLLOW-UP VARIABLES	Single Ss Mean	Single Ss S.D.	Married Ss Mean	Married Ss S.D.	*df*	*t*	two-tailed *p*
ACHIEVEMENT							
Educational attainment	12.50	2.10	11.90	2.10	170	1.65	.10
Occupational level	3.40	.97	3.20	.87	166	1.29	.20
Weekly income	2.67	.95	3.07	1.11	134	-2.06	.04
MODERATOR							
Number of jobs	2.51	1.46	2.57	1.57	164	-.25	.80
Job change index	.79	.48	.73	.41	163	.85	.40
Number of places lived	2.27	1.60	2.11	1.52	170	.63	.53
Change of residence index	.81	1.13	.60	.48	159	1.67	.10
Farthest distance lived	1.08	.34	1.14	.35	169	-1.09	.28
Urban/rural environment	1.69	.47	1.62	.49	168	.80	.42
Health Opinion Score	26.06	4.68	25.73	4.30	169	.44	.66

subjects. Of the 19 t tests reported in Table 4.2, significant differences (beyond the .05 level) are found for only 2 variables, barely above what one would expect for this number of t tests by chance alone. The mothers of the single subjects had received significantly more education than those of the married subjects, while the single subjects reported significantly less individual weekly income than the married subjects.* The groups appear different, but not to a statistically significant degree, on three other variables of interest. For example, single subjects had a higher MMPI Pathology Index ($p < .08$) than the married subjects. This pattern is consistent with findings (Phillips, 1953; Ullmann, 1967) that men never marrying show greater indices of psychological maladjustment. Two additional nonsignificant trends suggest that single subjects received slightly more formal education ($p < .10$) and changed residences slightly more often ($p < .10$) than the married subjects. Incidentally, no single subjects reported having had children.

Although the correlational analyses showed family variables to be very important to success, both in the eighth grade and at the time of followup, simply knowing whether a person is married or single does little to increase our understanding of the relationship between family status and the achievement-related measures used in the study. The number of children in the family of origin and subjects' own eagerness to marry and to create a family are highly related to the achievement measures and to the most powerful predictor of achievement, intellectual ability. However, simply knowing a person's marital status tells us little about the likelihood of achievement. Several factors may have contributed to this finding. The unequal size of the groups (30% single, 70% married) or dichotomizing marital status into single and once married may have affected the observation of group differences. Thus, a more discriminating measure, such as age at first marriage, rate of childbearing, or degree of marital satisfaction might show a greater association with achievement.

HIGH AND LOW PSYCHOPATHOLOGY

Table 4.3 presents the means, standard deviations, and t-test results comparing those subjects with a low- and high-MMPI Psychopathology Index as measured in the eighth grade. Slightly fewer subjects are in the low-pathology group (41%) than in the high (59%). Of the 21 total t tests, 4 are significant beyond

*Married subjects were asked to report their individual incomes separately from their family incomes, but it is not known how completely they complied with this request.

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TABLE 4.3 TESTS OF SIGNIFICANCE BETWEEN SUBJECTS WITH LOW AND HIGH MMPI PATHOLOGY INDICES FOR PREDICTOR AND FOLLOW-UP VARIABLES

PREDICTOR VARIABLES	Low Mean	Low S.D.	High Mean	High S.D.	df	t	two-tailed p
FAMILY BACKGROUND							
Breadwinner's occup. level	3.23	1.20	3.08	1.10	113	.69	.49
Mother's education	10.06	2.55	8.84	2.33	107	2.50	.01
Number of children in family of origin	5.24	3.07	6.12	3.57	119	-1.44	.15
PERSONAL ATTITUDES							
Desired education	3.04	1.12	2.94	1.08	119	.50	.62
Satisfaction with self	3.36	.62	3.12	.89	119	1.76	.08
Desire to live in home community	2.54	1.48	2.47	1.64	118	.23	.82
INTELLECTUAL							
Stanford Achiev.	135.68	20.33	123.98	20.96	106	2.92	.01
Stanford-Binet IQ	94.44	13.21	86.07	16.31	93	2.76	.01

FOLLOW-UP VARIABLES	Low Mean	Low S.D.	High Mean	High S.D.	df	t	two-tailed p
ACHIEVEMENT							
Educational attainment	12.43	2.14	11.82	2.09	172	1.86	.06
Occupational level	3.17	.82	3.39	.99	167	-1.58	.12
Weekly income	2.97	1.02	2.88	1.15	134	.48	.63
MODERATOR							
Number of jobs	2.32	1.40	2.87	1.64	165	-2.33	.02
Job change index	.70	.42	.83	.47	164	-1.87	.06
Number of places lived	2.19	1.47	2.08	1.63	172	.46	.64
Change of residence index	.60	.60	.62	.81	161	.49	.62
Farthest distance lived	1.46	.90	1.25	.80	171	1.56	.12
Urban/rural environment	2.74	1.09	2.85	1.18	169	-.60	.55
Age at first marriage	19.10	2.01	19.11	2.01	114	-.03	.97
Number of children	.99	.96	.90	.09	127	.50	.62
Rate of childbearing	.17	.14	.15	.14	113	.65	.52
Health Opinion Score	25.66	4.80	25.86	3.86	170	-.29	.77

the .05 level, indicating that subjects with high psychopathology indices came from families where the mother had less formal education and that subjects scored significantly lower on the two intellectual tests. However, the groups are significantly different on only one of the 13 follow-up variables; those with high pathology indices had held more jobs as young adults. Also of interest are relationships approaching significance; those subjects with high pathology indices reported less satisfaction with themselves ($p < .08$) when they were in the eighth grade, they did not go as far in school as young adults ($p < .06$), and they changed jobs more often ($p < .06$) than those with lower indices.

Thus, while highly pathological MMPI profiles in the eighth grade are not predictive of high rates of future psychiatric symptoms or treatment, they also fail to be indicative of a reduced rate of subsequent achievement. There was a nonsignificant trend indicating higher pathology was associated with slightly reduced levels of subsequent achievement.

MIGRATION VARIABLES

Subjects living in and outside North Carolina. Results of the t tests comparing two groups--those who always lived in North Carolina and those who had lived outside the state at some point during the ten-year follow-up period--are presented in Table 4.4. Tests are computed on all predictor and follow-up variables except, for obvious reasons, the variable measuring the farthest distance from home ever lived. Seven of these 21 tests are significant beyond the .05 level. Those subjects who had ever lived outside North Carolina (excluding military service) were more likely to have desired ($p < .05$) and received ($p < .001$) more education, to have worked at higher status jobs ($p < .04$) and more frequently changed ($p < .04$) jobs, to have been living in more urban settings at the time of followup ($p < .001$), and to have had fewer children ($p < .01$) at a slower rate ($p < .01$) than those who had never lived outside the state. This variable measures the farthest distance they had *ever* lived from Millfield and does not necessarily represent their residence at the time of followup. Nonsignificant findings worthy of mention include a tendency for those who had lived outside the state to come from smaller families ($p < .15$) and to have had higher Stanford Achievement Test scores ($p < .07$) and a lower MMPI Psychopathology Index ($p < .06$). These significant differences and nonsignificant trends draw a consistent picture indicating that subjects who lived out of the state appeared to have performed better on academic tests, come from smaller families, and desired more education when they were in the eighth

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TABLE 4.4 TESTS OF SIGNIFICANCE BETWEEN SUBJECTS LEAVING AND REMAINING IN NORTH CAROLINA FOR PREDICTOR AND FOLLOW-UP VARIABLES

	Ss remaining		Ss leaving N.C.				two-tailed
	Mean	S.D.	Mean	S.D.	*df*	*t*	*p*
FAMILY BACKGROUND							
Breadwinner's occup. level	3.15	1.10	3.40	1.58	79	-.62	.54
Mother's education	9.80	2.30	8.89	3.41	76	1.05	.30
Number of children in family of origin	5.92	3.40	4.20	3.08	83	1.46	.15
PERSONAL ATTITUDES							
Desired education	2.95	1.11	3.70	.95	83	-2.04	.05
Satisfaction with self	3.27	.72	3.10	.74	83	.68	.50
Desire to live in home community	2.69	1.61	1.90	1.20	82	1.49	.14
INTELLECTUAL							
Stanford Achiev. Test	130.38	20.88	144.55	29.90	76	-1.82	.06
Stanford-Binet IQ	90.68	15.86	98.42	14.20	67	-.24	.22
PERSONALITY							
MMPI Pathology Index	538.86	100.8	499.82	69.10	170	1.79	.06

FOLLOW-UP VARIABLES	Ss remaining		Ss leaving N.C.				two-tailed
	Mean	S.D.	Mean	S.D.	*df*	*t*	*p*
ACHIEVEMENT							
Educational attainment	11.90	2.04	13.60	2.44	171	-3.58	.001
Occupational level	3.34	.84	2.75	1.14	166	2.24	.04
Weekly income	2.90	1.09	3.22	.88	132	-1.17	.24
MODERATOR							
Number of jobs	2.55	1.53	2.56	1.59	164	-.04	.97
Job change index	.72	.42	.93	.54	163	-2.12	.04
Number of places lived	2.13	1.58	2.31	1.16	171	-.75	.45
Change of residence index	.64	.76	.77	.50	161	-.78	.43
Urban/rural environment	1.69	.46	1.30	.47	168	3.66	.001
Age at first marriage	18.90	2.00	19.80	1.81	115	-1.62	.11
Number of children	1.05	.96	.41	.51	128	2.69	.01
Rate of childbearing	.18	.14	.07	.10	115	2.84	.01
Health Opinion Score	25.71	4.20	25.97	5.91	169	-.25	.80

grade. By young adulthood, they had shown greater educational and occupational achievement, had lived in more urban settings, and had lower rates of childbearing. Having lived outside of North Carolina, then, even for a short while, is clearly associated with greater achievement.

Subjects living in rural and urban areas. Comparisons of subjects living in urban or in rural environments at the time of followup are presented in Table 4.5. Eight of the 21 t tests are significant beyond the .05 level. Subjects living in an urban area at the time of followup came from significantly smaller families ($p < .02$), went further in school ($p < .002$), had higher occupational levels ($p < .003$) and incomes ($p < .002$), and were more likely to have lived far from the Millfield area ($p < .001$). The urban subjects also married later ($p < .002$) and had lower fertility as measured by both numbers of children ($p < .01$) and childbearing rate ($p < .01$). On this follow-up index, only one predictor variable is different for the groups (urban subjects came from significantly smaller families), indicating that this outcome measure is not easily predicted from eighth-grade data. It is, however, associated with important indications of educational, economic, and family success at the time of followup.

Subjects leaving and staying at home. The final migration variable divided subjects into those still living with their parents and those who had left home; those comparisons are presented in Table 4.6. First, it should be noted that, not surprisingly, many more subjects left home (73%) than stayed at home. While the percentage of subjects leaving home is quite similar for blacks (77%) and whites (83%), more females (81%) than males (63%) had left home. White females were most likely to have left (82%), with black females (70%) and white males (73%) having almost equal percentages. Of the 18 tests reported in this table, only 3 are significant beyond the .01 level. Subjects who left home came from families in which the mothers had significantly less education; at the time of followup, these subjects showed significantly higher achievement on both job-related variables. They worked at higher status jobs and earned larger wages each week. Because subjects who stayed at home had no opportunity to live far away or in more urban settings, comparison of other migration variables was inappropriate.

The approach to the migration data taken here reveals several relationships not dealt with by the method used in Chapter 3. The correlational analyses found a small significant association between some of the migration variables and achievement and also indicated almost none of the eighth-grade variables is predictive of migration. The data reported here, however,

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TABLE 4.5 TESTS OF SIGNIFICANCE BETWEEN SUBJECTS LIVING IN RURAL AND URBAN AREAS FOR PREDICTOR AND FOLLOW-UP VARIABLES

PREDICTOR VARIABLES	Rural Ss Mean	Rural Ss S.D.	Urban Ss Mean	Urban Ss S.D.	*df*	*t*	two-tailed *p*
FAMILY BACKGROUND							
Breadwinner's occup. level	3.19	1.61	3.19	1.20	78	.00	1.00
Mother's education	9.50	2.52	9.90	2.70	75	.64	.52
Number of children in family of origin	6.47	3.69	4.61	3.00	82	-2.43	.02
PERSONAL ATTITUDES							
Desired education	2.98	1.12	3.18	1.07	82	.82	.42
Satisfaction with self	3.27	.69	3.21	.08	82	-.38	.70
Desire to live in home community	2.55	1.60	2.62	1.58	81	.21	.83
INTELLECTUAL							
Stanford Achiev. Test	130.00	21.00	135.90	24.70	75	1.11	.27
Stanford-Binet IQ	90.00	15.60	93.90	16.40	66	.96	.34
PERSONALITY							
MMPI Pathology Index	534.50	98.30	534.50	99.60	169	.00	1.00

FOLLOW-UP VARIABLES	Rural Ss Mean	Rural Ss S.D.	Urban Ss Mean	Urban Ss S.D.	*df*	*t*	two-tailed *p*
ACHIEVEMENT							
Educational Attainment	11.80	2.00	12.80	2.30	170	3.17	.002
Occupational level	3.41	.88	2.92	.89	165	-2.99	.003
Weekly income	2.72	1.03	3.31	1.08	132	3.12	.002
MODERATOR							
Number of jobs	2.53	1.51	2.60	1.60	163	.27	.79
Job change index	.71	.43	.83	.46	162	1.74	.08
Number of places lived	2.24	1.71	1.93	.53	170	-1.24	.21
Change of residence index	.65	.77	.61	.52	159	-.38	.70
Farthest distance from home	1.06	.27	1.26	.44	169	3.75	.001
Age at first marriage	18.60	1.80	19.80	2.00	115	3.16	.002
Number of children	1.13	1.00	.70	.75	127	-2.57	.01
Rate of childbearing	.19	.15	.12	.12	113	-2.59	.01
Health Opinion Score	25.93	3.93	22.58	5.23	169	-.49	.62

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TABLE 4.6 TESTS OF SIGNIFICANCE BETWEEN SUBJECTS LEAVING AND STAYING AT HOME FOR PREDICTOR AND FOLLOW-UP VARIABLES

PREDICTOR VARIABLES	Ss staying home Mean	S.D.	Ss leaving home Mean	S.D.	*df*	*t*	two-tailed *p*
FAMILY BACKGROUND							
Breadwinner's occup. level	3.10	1.24	3.21	1.15	79	-.34	.73
Mother's education	10.90	2.40	9.30	2.30	76	2.67	.01
Number of children in family of origin	6.12	3.78	5.57	3.44	83	.65	.52
PERSONAL ATTITUDES							
Desired education	2.82	1.14	3.11	1.11	83	-1.06	.29
Satisfaction with self	3.18	.59	3.27	.77	83	-.40	.62
Desire to live in home community	2.81	1.57	2.52	1.60	82	.71	.48
INTELLECTUAL							
Stanford Achiev.	125.90	22.50	133.80	22.10	76	-1.33	.19
Stanford-Binet IQ	90.00	11.90	91.90	16.80	67	-.40	.69
PERSONALITY							
MMPI Pathology Index	551.20	102.90	527.50	95.50	172	1.45	.15

FOLLOW-UP VARIABLES	Ss staying home Mean	S.D.	Ss leaving home Mean	S.D.	*df*	*t*	two-tailed *p*
ACHIEVEMENT							
Educational attainment	11.90	2.17	12.30	2.15	173	-1.05	.29
Occupational level	3.59	.90	3.14	.87	168	2.90	.01
Weekly income	2.54	.85	3.01	1.12	134	-2.78	.01
MODERATOR							
Number of jobs	2.45	1.41	2.60	1.57	166	-.60	.55
Job change index	.78	.46	.74	.43	165	.48	.63
Age at first marriage	18.70	1.90	19.10	2.00	115	-.78	.44
Number of children	.77	.81	1.01	.96	128	-1.08	.28
Rate of childbearing	.20	.12	.16	.14	115	.92	.36
Health Opinion Score	25.21	3.20	25.97	4.80	171	-1.00	.32

indicate migration is significantly related as a moderator variable to both educational and economic achievement.

For each analysis, migration--or moving from Millfield--is associated with higher achievement, much as in data reported elsewhere (Duncan, 1956; Hamilton, 1959; Shaw, 1975). Even though relatively few of our subjects made permanent moves to the urban centers in the northeast and midwest, temporary or shorter-distance migration is associated with higher achievement.

For each of the three migration variables, variables which are undoubtedly interrelated, the group leaving the environment in which they had lived during the eighth grade is more successful on at least one, and frequently on two, of the outcome measures of achievement. Subjects who had ever lived away had higher education and worked at higher status jobs. They also had lower fertility. Subjects who at followup were living in urban or small-city settings (in contrast to Millfield, all of which was rural) received more education, married later, and had lower fertility. Finally, subjects who had at least left their parents' domiciles were more likely to have attained higher levels of achievement on both economic variables. Thus, our subjects who stayed in the rural Millfield area, often still residing with their parents, were more likely to show a pattern of relatively lower achievement--they completed fewer years of education, worked at lower-status jobs, and earned lower incomes. They also tended to marry earlier and to have higher initial rates of fertility--characteristics shown in Chapter 3 to have a strong moderating effect on achievement.

The data reported in this chapter are consistent with earlier studies showing migration to be positively associated with achievement. They also indicate the methods used to measure migration may influence findings. Measures of migration must assess moves of relatively small distances and short duration in addition to permanent moves of great distances. This is especially true when dealing with rural subjects, the majority of whom, if our data are representative, do not show great migration. In effect, the migration shown by our subjects is distributed along a continuum anchored on one end by never leaving home at all and on the other by permanent moves of some distance. Most subjects fall toward the end of the continuum of low migration, however, reporting permanent moves of less than 50 miles to rural settings or small towns nearby and short-term moves of only a few months or years duration to farther points. If our methods had been more sensitive to shorter moves and to permanent moves of lesser distances, our understanding of the role this moderator variable plays in achievement might have been enhanced.

INTEGRATION OF RESULTS FROM CORRELATIONAL AND MEAN DIFFERENCE APPROACHES

Both approaches to our data analysis looked for factors associated with achievement--predictive variables spanning a decade's time and moderating characteristics of a contemporary nature. The approach described in Chapter 3 was based on correlational techniques and studied the relationship between all predictor and all moderator as well as achievement variables. This chapter divided subjects into groups based on their responses to each of six variables of special interest and tested differences between them on all other predictor and follow-up variables. The findings concerning achievement and the factors associated with it produced by these two approaches are quite consistent. From the vantage point provided by the two sets of analyses, a clear portrait is drawn of those subjects who achieved more and less than their peers in educational and occupational arenas.

Educational attainment, one of the three achievement variables, shows more significant relationships with other measures, both predictor and follow-up, than either of the other occupational achievement indices. Both methods of data analysis show almost the same profile of subjects with high- and low-educational achievement. Those who went further in school were those who, when in the eighth grade, scored higher on intelligence and achievement tests, came from smaller families, expressed a greater desire for education, and more frequently wished to leave the Millfield area. At the time of followup, they were the subjects who reported higher job statuses and higher weekly incomes, greater job change, had at some point lived outside North Carolina, presently lived in more urban areas, had married later, and had fewer children.

The two economic indices of achievement are less strongly and consistently related to other variables when either method of analysis is applied. Yet, a similar, albeit a less complete, picture than the one above is painted of the subjects with greater economic achievement. Higher achieving subjects are those who scored higher on both standardized intelligence-related tests administered in the eighth grade. They are also subjects who had changed jobs more often, who had lived for at least some time out of North Carolina, who were living at followup in more urban areas, and who had married later and had children at a lower rate. Thus, only the intellectual ability measures from the eighth grade data are predictive of economic achievement, but the same migration and family circumstance factors are associated with economic as with educational achievement.

The correspondence between these two profiles of higher achieving subjects is striking. Doing well on the intelligence and academic achievement tests is positively associated with later achievement, regardless of the measure of achievement. Higher achievement is also associated with at least temporary or short-distance migration to more urban areas. Finally, higher achievement of both an educational and an occupational nature is unquestionably associated with a delay in undertaking the responsibilities of marriage and parenthood.

Chapter 5

CONCLUSIONS

This final chapter integrates the major findings of the two results chapters and discusses their theoretical implications, focusing on factors associated with achievement in adolescence and young adulthood. Of particular interest is the stability of achievement and achievement-related behavior over the decade under study. Factors predictive of achievement for black and white rural southerners are compared with those factors identified for more affluent groups. The utility of the multidimensional model of achievement proposed in Chapter 1 is discussed in light of research findings.

THE INTELLECTUAL CLUSTER

Performance on the eighth-grade standardized tests of intellectual and academic ability is clearly related to subsequent achievement, both educational and economic. Previous longitudinal studies (for example, Terman, 1959; Eichorn, 1973) have shown verbal factors to be among the most prominent and consistent predictors of individual differences, and such basic verbal or intellectual attributes are found to be of great importance for our subjects as well.

The importance of intellectual ability measures to subsequent achievement can be viewed from either an individual or an environmental perspective. In making this distinction we are not talking about the difference between heredity and environment. The individual perspective suggests that some factors, whether genetic, prenatal, or experiential, result in some subjects being better able than others to think abstractly when using both verbal and quantitative symbols. These data provide support for the notion of internal stability and continuity of intellectual functioning over time, without suggesting the historical source of this ability. Individual differences in ability, desire, and persistence that exist by the time subjects are in the eighth grade and continue through young adulthood suggest that these internal characteristics have been set down and developed in a consistent manner earlier in life.

That performance on these eighth-grade intellectual variables is associated with later educational attainment is hardly an unexpected finding; what may be surprising to some is the fact that these variables are also significantly associated with measures of later occupational achievement and with population variables--such as the age at first marriage and rate of childbearing. Individual differences in ability that account for differences in performance on intellectual tests and in school are, in addition, important to the overall quality and direction of a person's life.

The internal or individual explanation suggests that by the 13th or 14th year of life, differences among people in certain intellectual and educationally related skills have already been established in a way that leads to relatively consistent performance in later life. These characteristics are related not only to success in school but to success in a broad range of life experiences as well. The findings support other work (for example, see Eichorn, 1973) showing similar relationships with subjects more representative of the mainstream population.

From an environmental perspective, the relationship between intellectual measures and later schooling and occupational status might be explained in terms of opportunity--societal pressures that promote or hinder the likelihood of achievement in life. For example, it can be argued that social institutions and other sociocultural forces set up ways to facilitate or prevent successful life experiences. Cultural values and folkways of different social strata as modeled and taught by families influence such characteristics as verbal fluency, speech and behavioral styles, academic interests, and desire for achievement which might enhance or curtail opportunities for educational and vocational achievement. Reduced success in life can be the result of implicit or explicit racial discrimination or simply discrimination against less verbally facile, less well-educated, less "socially correct" kinds of behavioral styles. From this point of view, a young person who was born to minimally educated, poor parents on a small farm in Millfield and who was not especially successful in school would, at young adulthood, undoubtedly meet many obstacles to becoming a professional or managerial-level worker. In a sense, then, environmental forces at each point in his or her life would impede opportunities for achievement. Similarly, forces within the sociocultural milieu might well push in the direction of early marriage and early childbearing, all of which are negatively related to achievement variables.

When taking the broadest overview of our data regarding the intellectual cluster we have been describing, we come to the

conclusion that the internally oriented and the environmental perspectives are inextricably intertwined. Undoubtedly, individual differences in intellectual ability are highly related to achievement and to other indicators of success in life. At the same time, both during the formative years and young adulthood, situational factors exert both subtle and obvious pressures that affect the desire and opportunity both to make choices and to apply one's ability to the challenges available.

RACIAL DIFFERENCES IN ACHIEVEMENT

For both blacks and whites there is a positive relationship between educational attainment and scores on both of the intellectual measures; scores on intelligence tests are predictive of how far the youth will eventually go in school compared to others within the same racial group. Given the racial differences in performance on the intelligence measures in the eighth grade, one might have expected the two racial groups to have different degrees of success at young adulthood, especially in educational attainment. There were, however, no differences in number of years of schooling for blacks and whites. It was not possible from racial differences on intelligence measures taken in the eighth grade to predict later racial differences in educational attainment. However, the choice of measure of academic achievement may have influenced these findings. It is not known what effect the system of racially segregated schools had on the measure of educational attainment used. Arguments that students would have gone either less far *or* further in integrated schools seem equally plausible.

These findings, however, inevitably lead to the question of whether scores on the Stanford-Binet Intelligence Scale predict educational attainment in the same manner for both blacks and whites. Our data are consistent with other studies that have concluded that standard intelligence and achievement measures are more likely to underestimate intellectual potential in blacks. Hixson and Epps (1975) cite several studies which have concluded that any job screening or admissions procedures which use cut-off points based on standardized intellectual and achievement scores or even on grade point averages are likely to be biased against blacks. Further, they argue for the necessity of alternative predictive criteria for blacks and whites.

Compared with the lack of racial differences in educational attainment, black subjects achieved significantly lower job statuses and earned significantly lower incomes than white subjects. In light of the fact of no differences in educational attainment between the two racial groups, one must assume the

influence of reduced opportunity or other societal pressures stood in the way of black subjects' achievement in the occupational area.

PERSONALITY CHARACTERISTICS

The MMPI profiles of the eighth-grade Millfield students were examined for race and sex differences and also for their comparability to the findings of other studies conducted on the same age group (Ball, 1962; Hathaway *et al.*, 1959; Panton, 1959). Baughman and Dahlstrom concluded that while the Millfield students were similar in many ways to others of the same age, socioeconomic status, and geographical region, there were important differences, all of which suggest greater pathology. Specifically, the Millfield subjects' MMPI performance suggested that they had less effective self-control, were more self-centered, and more impulsive than others. The males in the Millfield sample especially showed more pathology when compared with standardized groups.

The MMPI results were puzzling, however, because other data did not yield similar indications of maladjustment. For example, teachers' personality and behavioral ratings were quite positive about the children and saw them as neither self-centered nor as under-controlled. In addition, the interviewers rated these adolescents quite favorably both as to level of personal adjustment and adjustment to their community.

Among the explanations offered by Baughman and Dahlstrom for these discrepant findings was the possibility that problematic personality characteristics indicated by the MMPI results were not evident in behavior because of the benign rural environment of Millfield, the pervasiveness of adult supervision at home and school, and the relatively large distances separating these early adolescents from their peers. Baughman and Dahlstrom speculated that a follow-up study might show whether these maladaptive characteristics would produce behavioral or adjustment problems later on, especially among those who left the Millfield environment.

Data from the studies of the Institute of Human Development (Livson and Piskin, 1967; MacFarlane, 1964) found the stability of measures of adjustment over time to be low. Livson and Piskin, for example, used California Q-Sort ratings of personality assessment data as a criterion of adjustment at age 30 and behavioral ratings for four different age spans when the subjects were children. The multiple correlations between the earlier measures and the criterion measure were typically

nonsignificant. However, measures taken on 11-, 12-, and 13-year-old subjects had some predictive success. Given that this age range was quite similar to that of the eighth-graders in our sample, we had some optimism about our data yielding successful predictions.

While readministering the MMPI to the subjects would have been of great value, the practical expense of a readministration was prohibitive. Most interviews were conducted over the telephone; consequently, the administration of a 566-item test was not a realistic possibility. Thus, given the practical constraints and the major focus on achievement in this follow-up study, a short screening measure of personality adjustment, the Health Opinion Survey (HOS) was selected. (The HOS was used effectively in the Sterling County epidemiological studies of psychiatric disturbance [Leighton, *et al.*, 1966].) In addition to other qualities, the HOS is brief and many of its items are similar to MMPI items. However, the range of scores on the HOS was rather constricted and skewed toward positive emotional adjustment. HOS scores were essentially unrelated to the Cooke Psychopathology Index based on MMPI scores (r = .04)--nor was the HOS related to any other predictor or follow-up measures. Although the MMPI scores were unrelated to later adjustment as measured by the HOS, they were related to several dimensions of achievement in the eighth grade and 10 years later as well. The more pathological a subject's performance on the MMPI, the more likely it was that he or she came from a less successful family background and scored lower on the intelligence measures.

Our follow-up data indicated that the relatively pathological MMPI profiles of Millfield eighth graders are not strongly predictive of disturbance or low achievement at young adulthood. Although we do not know whether other data or experiences in subsequent periods of our subjects' lives would yield indications of increased rates of disturbance, there was nothing in our data that suggested that such disturbance would be likely. The relatively low reported rates of psychiatric treatment or difficulties with the law, if accurate reflections of current functioning, would not portend greater psychological disturbance in the future.

Although unrelated to HOS scores or to reports of psychiatric treatment, the MMPI scores were to some extent predictive of achievement. When subjects were divided into low and high pathology groups, minor differences in achievement-related variables were noted.

For example, subjects in the high pathology group have slightly lower educational attainment (mean = 11.8 versus 12.4 for the low pathology group; $p < .06$). MMPI scores are also strongly related to the subjects' total number of jobs held and to how frequently he or she had changed jobs. MMPI pathology indices are positively correlated with both these job variables, indicating that subjects in the high pathology group had held significantly more jobs ($p < .02$) and had higher job change indexes ($p < .06$). However, MMPI scores were not related to the other employment measures, occupational status, or weekly income.

Since the predictions of maladjustment based on elevated MMPI profiles were not borne out, we must consider what factors might affect the overestimation of pathology. It is possible that chance variation influenced the results in the manner indicated. It is also possible that compared to other indices of success, personality adjustment is too unstable to be predicted over time. In that sense, our lack of relationships is consistent with previous indications that personality adjustment is relatively unstable over time, Livson's and Piskin's findings notwithstanding. This may be particularly true when the subjects are in early adolescence, when considerable fluctuation in adjustment over even short periods of time is common. A more likely possibility is that cultural differences between our sample and the normative sample make the original norms inapplicable to our subjects. For example, our sample was more racially mixed, more rural, and of lower socioeconomic status than the normative sample. These cultural differences may in fact suggest the need for different norms. Attempts being made to identify culturally diverse groups in order to develop different sets of MMPI norms may indeed be worthwhile (Gynther, 1972). Further investigation is needed to determine the existence of systematic biases in the MMPI and other widely used personality inventories.

THE FAMILY-SIZE CLUSTER

A prominent cluster of significant relationships was identified between achievement and the family size variables--size of family of origin and own speed of marriage and childbearing. Next to the intellectual ability measures, the most notable prediction from eighth-grade data was the predictive success of the variable "number of children in family of origin"; it is more strongly associated with follow-up measures of achievement than either of the other opportunity variables, mother's education or breadwinner's occupational status. It is significantly

negatively correlated with both the Stanford-Binet and the Stanford Achievement Test (-.43 with each of them) and positively correlated with the MMPI Psychopathology Index (.23), indicating that subjects from smaller families were more likely to score better on intelligence tests and to report somewhat less personal discomfort on the MMPI.

Because of the young age of subjects at the time of follow-up, three variables--age at first marriage, number of children, and rate of childbearing--were selected to represent the predictor variable of family size. These three variables, of course, are highly correlated with one another. In addition, they are also significantly related to achievement, particularly to educational attainment. True, a great deal of the variation on all follow-up variables could be accounted for simply by knowing how far a subject went in school and how many children he or she had at the time the follow-up data were gathered.

Although findings regarding the intellectual cluster were in accord with our expectations, we were somewhat surprised by the strength of the association of the family size cluster with achievement. This finding is, however, entirely consistent with population theorists' arguments about the importance of relatively low fertility to individual as well as collective happiness and to educational and vocational achievement. Having many children or having children close together creates burdens on a family system which often reduce opportunity. Children can be a financial drain, they need physical space, require supervision from adults in the family or paid child care, and they often can create countless stresses and problems for their parents. Having many children in a family with low financial resources, as undoubtedly was most often the case for the subjects from large families in our sample, almost inevitably creates enormous problems; one result of growing up under such circumstances is a diminished likelihood of acquiring a great deal of education. Limited education in turn adversely affects prospects for both occupational and economic achievement.

The high correlation between number of children in one's family of origin and one's own rate of childbearing suggests an almost inevitable repeating of the patterns of the past. From the perspective of personal development, growing up in a large family in relatively impoverished circumstances makes it unlikely that a person will develop what Bronson (1966) has called a sense of anticipatory planfulness. Some of our subjects, typically those from smaller families, seem to have acquired the ability to actively anticipate the negative and positive consequences of a decision, while others seem much less likely to

think or worry about the future. This dimension of actively anticipating outcomes versus more passively accepting externally imposed consequences is most relevant to birth control behavior. Given that the technology for preventing conception is readily available to all members of our society, it requires only the ability to anticipate consequences, to delay gratification briefly, and the willingness to engage in some relatively undemanding behavior to be successful. At least one member of the couple must actively decide to prevent conception and must feel sufficiently strong about such a decision to use contraceptives reliably and/or resist social pressures to have children. Although one could argue that planful behavior would be an inaccurate and superfluous illusion of control for persons with such marginal economic survival, this attitude of anticipatory planfulness seems to maximize people's ability to cope with the challenges and limitations external events impose.

The dimension of anticipatory planfulness also influences many other achievement-related behaviors. For example, how many years of schooling one completes, leaving aside the contribution of one's intellectual ability, is obviously largely dependent upon willingness to endure frustrations related to schoolwork with the anticipation of future rewards. In terms of our original model, anticipatory planfulness relates to the dimension of persistence which contributes to total achievement.

Having many children closely spaced together may not only be the result of a failure in anticipatory planning, but also of striving to have a large family quickly. In some subgroups within our society having a large family early in a couple's life is considered to be desirable and is actively sought as an entry into adulthood or a demonstration of masculinity or femininity. Therefore, there may be considerable social pressure to bear children which, when coupled with a desultory anticipatory attitude, makes family planning an unlikely outcome. Furthermore, because children are often seen as potential sources of satisfaction, people whose lives offer few of the positive accompaniments of educational achievement and economic success may be more likely to seek satisfaction within the family circle and from playing out a culturally accepted or prescribed role associated with masculinity or femininity.

Our results suggesting the less than positive effects of being reared in a large family, especially on intellectual development, are consistent with much recent evidence on the impact of family size on intelligence, most notably, Zajonc's (Zajonc and Markus, 1975) mathematical model of family size and intelligence. Zajonc has argued that the intellectual quality of children's early environment strongly influences the

development of their intellectual potential. According to his model, children from large families can be expected to experience speech quality and intellectual stimulation, on the average, of poorer quality than children from smaller families. Furthermore, children born later in families of any size grow up in an atmosphere less likely to foster intellectual development than do those born earlier. A child whose speech develops in a home with two other pre-school children will spend a considerable amount of time interacting with persons barely able to speak themselves and will be exposed to much less intellectual stimulation than a child with no siblings who spends most of his time interacting with adults. Zajonc has thus documented that (1) average intelligence scores of countries rise as birthrates decrease and (2) fluctuating Scholastic Aptitude Scores of American youth are related to changes in the birthrate and, consequently, in family size. Negative correlations in Millfield subjects between family size and Stanford-Binet IQ scores are consistent with Zajonc's formulations. Our data indicate that large family size, at least when accompanied by low levels of affluence, is negatively related not only to intellectual performance but to educational and occupational achievement as well.

A word needs to be said about the influence of attitudes toward fertility of the rural southern culture within which our subjects were raised. Since the majority of subjects came from relatively large families, great importance appeared to be attached in the rural setting to having children. Although these long-standing cultural expectations have a powerful influence, each individual must decide the degree to which those expectations will be adopted. The strong association of the family-size cluster with achievement is an especially noteworthy finding of this study and provides support for interventions aimed at family planning and population control.

THE MIGRATION DATA

Few significant relationships were found between predictor variables and the migration outcome variables used in this study, although migration is shown to be a significant moderator of achievement. In fact, most of the Millfield eighth graders did not move very far away from home. The great majority (80%) of the subjects found at the time of followup lived within 50 miles of Millfield; most of them lived on farms or in rural but nonfarming locations (63%). Given the fact that the subjects were still relatively young at the time of followup, it is possible that more may eventually migrate, although we would expect that most rural to urban migration would already have taken

place by this time of life. It is also likely the rate of migration would have been higher had more of the subjects been successfully located.

The infrequency of migration from Millfield was contrary to our expectations. Much has been made of the waves of migration of black and white southern rural residents seeking better job opportunities in northern and midwestern industrial centers, with the best and brightest overrepresented in the migrant category. Perhaps this trend is reversing itself; a trend may also be developing toward returning to the South in search of roots or a more pacific life style. Among those returning are many who have been successful in metropolitan areas in other parts of the country. Perhaps alongside that trend to return is a tendency not to leave rural places at all. Although Millfield is an area consisting of several small crossroads communities surrounded by rural and farming areas, it is connected to nearby industrial areas by relatively good highways. Economic conditions in Millfield and the surrounding communities in the late 1960s and early 1970s were quite favorable in some respects; unemployment was below the national average, and, although industrial wages were among the lowest in the nation, the cost of living was also relatively low. Some of our subjects may have left Millfield and the state of North Carolina to seek better jobs ("pull" factors) or because they disliked the quiet rural atmosphere ("push" factors). However, they did so in such small numbers it was not possible to determine whether those subjects had any motivational characteristics that differentiated them from others. Thus, it was not possible to explore the reasons people had for moving or for staying or how these reasons might be associated with achievement. Since we have no prior data about the frequency of migration from the Millfield area in the 1950s and 1960s, it is impossible to make comparisons of migration patterns or to draw any conclusions about changes over time. Therefore, we are only able to conjecture about the likelihood of a change in migration by assuming that Millfield's migration rate had formerly been greater as was typical of other areas of the rural South from which young people left to seek economic success elsewhere.

Living away from Millfield and from the state of North Carolina, even if only for a brief period of time, was, however, associated with greater achievement. Subjects who left the state had more education, worked at higher-status jobs, and had lower fertility rates than those who had always lived in North Carolina. Interestingly enough, a subject's stated desire to live or not to live in Millfield was not related to having left the state, but desired education as stated in the 8th grade is

related to moving behavior; those subjects who wished to go further in school were more likely to have left North Carolina for some period of time. These tendencies may reflect a positive degree of anticipatory planfulness that is related to other indicators of achievement.

THE METHODOLOGY IN RETROSPECT

It seems worthwhile to reflect a bit on the methodology of the research reported here. The eighth grade appears to be an optimal time to begin to study subjects for the purpose of following patterns of achievement in adult life. At that time subjects' abilities and expectancies are relatively well-formed and yet substantial public school attrition has not begun. However, the time chosen for followup enabled us to tap only the beginning indications of success or failure. With hindsight it would perhaps have been wiser to conduct the follow-up study when the subjects were five years older to allow for fuller development of family-size patterns and for occupational stability.

The financial constraints under which we operated also forced us to limit the data gathered to a relatively brief in-person or telephone interview, leaving out a number of items worthy of consideration. Intensive and holistic studies of selected subjects would undoubtedly have fleshed out the conclusions drawn from the quantitative data. Our measure of academic achievement was a very rough one based solely on the number of years of schooling completed; it would have been more convincing to have had an independent measure of performance on academic tasks. In addition, some finer characterization of the subjects' jobs might have helped to identify shades of success. With regard to migration, measures more sensitive to geographic mobility nearer home should be used in future studies. A move of only five miles may have been more psychologically meaningful and have more ramifications on other aspects of life for some than a much longer move would have had for others. However, there was no way of identifying such a move nor its impact from the data gathered. The results of our study also conclusively indicate the importance of studying family circumstance variables if we wish to understand achievement.

Because it may be helpful to other researchers, we underline the success we achieved with our follow-up methods. While we initially hoped to be able to locate and have the participation of at least 50% of the original subjects, we were able to locate 67% of the total sample. No one refused to participate. The fact that so few of the subjects migrated to distant areas

certainly contributed to this high success rate, but also we feel that our manner of tracking subjects (described in detail in Chapter 2) was very important to our success. Among the most useful devices was the use of names and addresses from public school records and the solicitation of help from subjects in finding their classmates. The persistence and ingenuity of our field interviewers influenced our success in locating subjects as well.

None of these comments on the methodology or results in any way reflects negatively on Baughman's and Dahlstrom's investigation, particularly, as it was not designed with a follow-up study in mind. Because they were so thorough and comprehensive in the original study, we were later able to capitalize on their wealth of data.

Perhaps in the future we will be able to study more fully the subjects that we interviewed for this follow-up study. A second followup when subjects are 35 to 40 years of age should permit us to achieve a better sense of what variables are good predictors over the longer haul. Because achievement is less a final outcome measure than one relevant to selected points in the life cycle, it needs to be examined through time in order to get a sense of its ebb and flow. With our Millfield subjects, there was certainly no endpoint at the eighth grade, nor was there one when they reached young adulthood. Although achievement is defined by researchers placing a value on behaviors of subjects at particular points in their lives, we are heartened to find such consistency in the kinds of measures that we studied, particularly over a ten-year period.

IMPLICATIONS

Perhaps the most general conclusion to be drawn from the data we have presented is that while the factors underlying achievement in our society are many and complex, achievement, as assessed by brief interviews, can be predicted from some rather traditional measures of intellectual ability, stated desire for education, and family background variables. Quite clearly, there were individual differences among Millfield eight graders, and these differences were related to differential achievement in young adulthood. Individual differences in measured intellectual ability are related to eventual educational attainment and occupational success, but the ability measures alone did not account for all of the variance. A number of other factors interacted with ability to influence success, including both personal desire on the part of the subjects and societal influences

that increased or decreased the opportunities open to them. Findings regarding consistency over time in certain personal attributes, notably intellectually related variables, also substantiate work at the Institute of Human Development on subjects more representative of the American mainstream. Given the differences in cultural setting and historical era during which the North Carolina and the California subjects lived, this consistency is especially noteworthy.

One of the most surprising results of our study is the fact that our subjects at young adulthood seemed to be as successful as the average American citizen of their age in terms of the achievement variables studied. These results were unexpected because of the less than optimistic predictions made on the basis of the eighth grade intellectual and personality data. We have already pointed out that some of the outcome variables used, especially the measure of personality adjustment, were somewhat superficial and subject to distortion. Our follow-up procedures may also have failed to locate those with the poorest adjustment and lowest achievement or the subjects may have underreported their rates of psychiatric or legal difficulty or the kinds of psychological discomfort assessed by the HOS. In addition, since most of the subjects were still living within 50 miles of Millfield when interviewed, the absence of high rates of maladjustment cannot refute Baughman's and Dahlstrom's hypothesis about the relationship between environmental stress and overt psychopathology. Thus, based on the data in hand, the Millfield eighth graders appear to have been doing well ten years later, although limitations of our data weaken somewhat the confidence with which this conclusion can be made.

Earlier we proposed that the personality dimension of anticipatory planning seemed to underlie a number of our indices of achievement and related moderator variables. Discounting ability, the degree to which a person actively anticipates and plans for the future may have the strongest positive effect on both academic and economic success. The abilities to anticipate and plan for the future certainly seem related to planning for controlled family size and also to other kinds of achievement and possibly to migration as well.

While both individual ability and personality characteristics are important to success in life, societal factors which facilitate or discourage success are plainly important as well. Although the adolescent years of our Millfield subjects occurred during a time of great change and ferment in society, we have no direct way of knowing how these changes influenced our subjects. The Millfield eighth graders completed their public school

education in segregated schools; a number of restrictions on the achievement of blacks and women, while in the process of significant reduction, doubtlessly continued to influence our subjects. For example, black subjects and female subjects, while not differing from white male subjects in total years of education, differed from them in occupational level and income. This fact would seem to indicate that differential opportunities and expectancies, at least for economic achievement, still played an important part in the lives of our subjects at the time that the follow-up data were collected.

While we cannot show specifically how societal barriers may have influenced our subjects, we have been able to demonstrate the importance of individual ability and motivation. Given reasonably equal opportunity, we would expect ability and motivation to interact with and have important influences on the achievement variables with which we have been concerned. Given the actual case of unequal opportunity, individual variables have even more effect. Thus, some individuals, by virtue of their ability, desire, and persistence, will succeed given the most adverse circumstances while others, under even the most benevolent conditions, either through lack of ability or lack of motivation or both, will not succeed.

APPENDIX

FOLLOW-UP QUESTIONNAIRE

As we explained in our recent letter, we are trying to find out what has happened to you since you were in the eighth grade. Please answer the following questions. We will use your answers for research purposes only and will keep them strictly confidential.

First, we would like to ask you some questions about your educational and occupational history since you were in the eighth grade.

1. a. What was the highest grade that you completed in public school?

___8th grade ___9th grade ___10th grade
___11th grade ___12th grade

b. How many years of business or technical training did you complete?

0 1 2 3 4

c. How many years of college did you complete?

0 1 2 3 4

d. How many years of graduate or professional school did you complete?

0 1 2 3 4

2. a. Are you presently employed?

___yes
___no

3. a. IF UNEMPLOYED:

Are you currently a

___student
___housewife
___other (Specify)

b. IF EMPLOYED:

1. For whom do you work (For example: mill, hospital, school, self-employed) _____
2. What kind of work do you do? (For example: farming, secretarial, construction, fabric weaving)

_____

4. Please indicate which of the following best describes *your* current weekly income.

___less than $50.
___between $50 and $100.
___between $100 and $150.
___between $150 and $200.
___between $200 and $250.
___between $250 and $300.
___over $300.

5. Please list the jobs you have held since leaving school. Start with your first job after leaving school.

Type of work	From Month, Year	To Month, Year	Location Town	State

6. Have you served in any branch of the military?

___yes
___no

What was your rank at discharge or your present rank?

_____

7. a. Have you ever been *charged* or *arrested* for any crime since you were in the eighth grade (including the time you were in the military). Do *not* include minor traffic violations such as illegal parking or speeding.

___no
___yes

b. If yes, how many times?

1 2 3 4 or more

8. a. Have you ever been *convicted* of an offense other than a minor traffic violation?

___no
___yes

b. If yes, how many times?

1 2 3 4 or more

Next we would like you to answer some questions about the places that you have lived since you were in the eighth grade.

9. For each place that you have lived we would like to know how long you lived there and whether or not you were living with your parents or close relatives. Start with the place where you lived in the eighth grade and end with your present residence.

Location (town, state)	Year	Length of time	Living with parents or close relatives
1. _____			___yes ___no
2. _____			___yes ___no
3. _____			___yes ___no
4. _____			___yes ___no
5. _____			___yes ___no
6. _____			___yes ___no
7. _____			___yes ___no
8. _____			___yes ___no
9. _____			___yes ___no

10. ___yes ___no
11. ___yes ___no
12. ___yes ___no

10. Which of the following best describes the area in which you now live?

___within a city
___suburban
___rural area (non-farm)
___rural farm area

In this section we want you to answer some questions about your marital status, work and leisure time activities.

11. a. What is your current marital status?

___single, never married
___married
___divorced
___separated

b. Have you ever been married before?

___yes
___no

c. If married, how old were you when you were first married?

_____

12. How many children do you have?

0 1 2 3 4 5 or more

13. a. What was the highest grade your present spouse (husband *or* wife) completed in public school?

8th 9th 10th 11th 12th

b. How many years of business or technical training did your present spouse complete?

0 1 2 3 4

c. How many years of college did your present spouse complete?

0 1 2 3 4

d. How many years of graduate or professional school did your present spouse complete?

1 2 3 4 or more

14. a. Is your present spouse currently employed?

___yes ___no

b. If your spouse is UNEMPLOYED:

Is your spouse a

___student
___housewife
___other (Specify)_____

15. If your spouse is EMPLOYED:

a. For whom does your spouse work? (For example: mill, hospital, school system, self-employed) _____
b. What kind of work does your spouse do? (For example: farming, secretarial, construction)_____

16. Please indicate which of the following best describes your *spouse's* weekly income.

___less than $50.
___between $50 and $100.
___between $100 and $150.
___between $150 and $200.
___between $200 and $250.
___between $250 and $300.
___over $300.

17. a. Are you now a member of any church?

___yes
___no

b. How often do you attend church services?

___once a week or more.
___once a month.

___several times a year.
___once a year.
___never.

18. a. Do you belong to any social or civic organizations?

___yes
___no

b. If yes, how many?

1 2 3 4 or more

c. How often do you attend functions given by these organizations?

___once a week or more
___once a month
___several times a year
___once a year
___never

In this final section we would like you to answer some questions about your general health since you were in the eighth grade.

19. Have you ever been hospitalized for physical illness since you were in the eighth grade?

___yes ___no

20. Do you have any physical or health problems at the present time?

___yes ___no

21. Do your hands tremble enough to bother you?

___yes ___no

22. Are you troubled by your hands or feet sweating so that they feel damp and clammy?

___Never ___Sometimes ___Often

23. Are you bothered by your heart beating hard?

___Never ___Sometimes ___Often

24. Do you tend to feel tired in the morning?

___Never ___Sometimes ___Often

25. Do you have any trouble getting to sleep or staying asleep?

___Never ___Sometimes ___Often

26. How often are you bothered by having an upset stomach?

___Never ___Sometimes ___Often

27. Are you bothered by nightmares (dreams that frighten or upset you)?

___Never ___Sometimes ___Often

28. Are you troubled by cold sweats?

___Never ___Sometimes ___Often

29. Do you feel that you are bothered by all sorts (different kinds) of ailments in different parts of your body?

___Never ___Sometimes ___Often

30. Do you smoke?

___Never ___Sometimes ___Often

31. Do you have loss of appetite?

___Never ___Sometimes ___Often

32. Does ill health affect the amount of work (or housework) that you do?

___Never ___Sometimes ___Often

33. Do you feel weak all over?

___Never ___Sometimes ___Often

34. Do you have spells of dizziness?

___Never ___Sometimes ___Often

35. Do you tend to lose weight when you worry?

___Never ___Sometimes ___Often

36. Are you bothered by shortness of breath when you are not exerting yourself?

___Never ___Sometimes ___Often

37. Do you feel healthy enough to carry out the things that you would like to do?

___Never ___Sometimes ___Often

38. Do you feel in good spirits?

___Never ___Sometimes ___Often

39. Do you feel nervous or restless?

___Never ___Sometimes ___Often

40. Do you drink?

___Never ___Sometimes ___Often

41. Do you at times wonder if anything is worthwhile anymore?

___Never ___Sometimes ___Often

42. a. Have you ever received help because of emotional, nervous or marital problems?

___yes ___no

b. If yes, how many times? _____

c. From whom did you receive this help? (For example, a psychologist, a physician, minister, psychiatrist, social worker) _____

d. Have you been hospitalized for emotional or nervous problems since you were in the eighth grade?

___yes ___no

e. If yes, how many times? _____

43. a. Has your spouse ever received help for nervous, emotional or marital problems?

    b. If yes, how many times? _____

    c. From whom did your spouse receive this help?

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